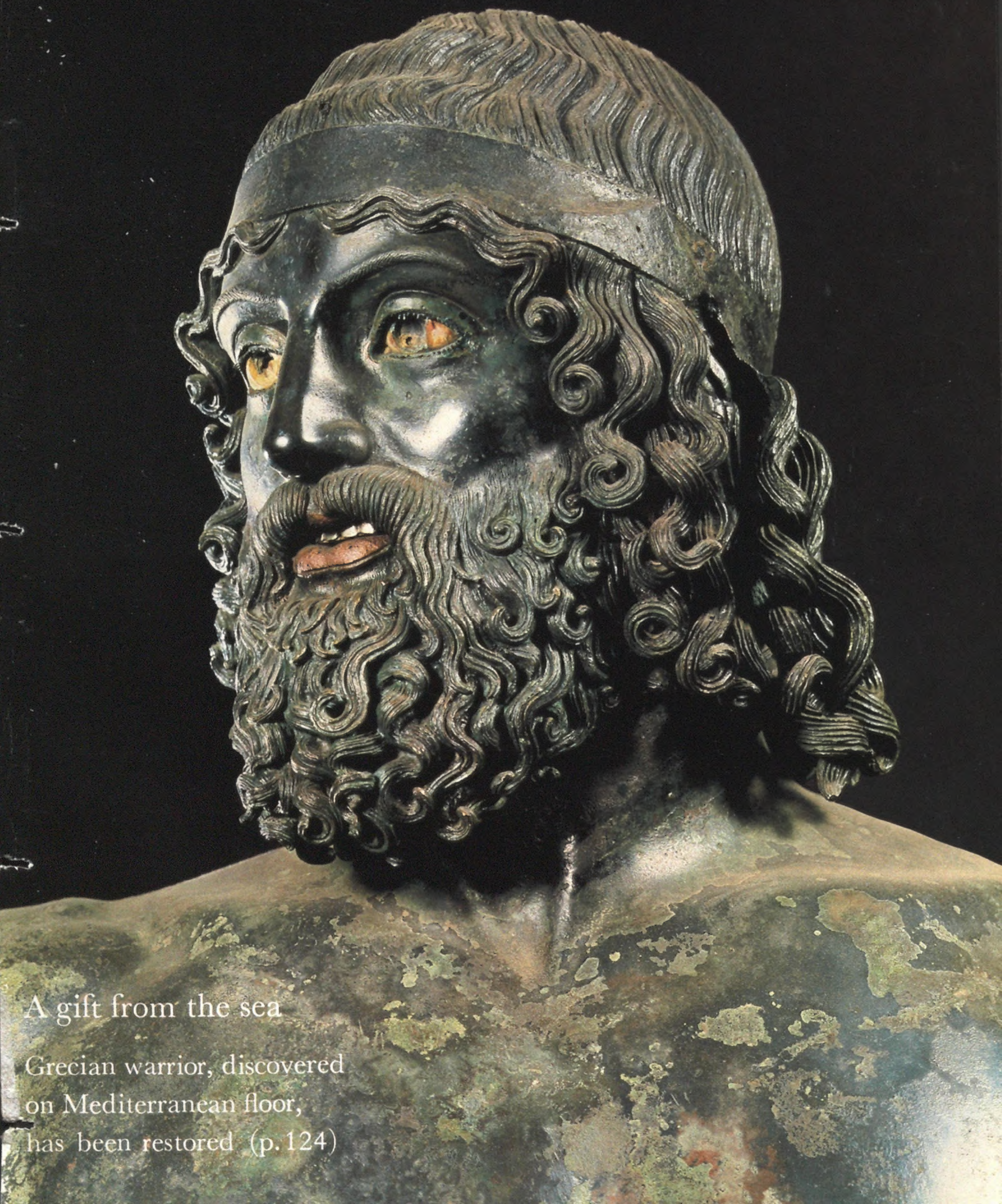
November 1981

Smithsonian



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Grecian warrior, discovered
on Mediterranean floor,
has been restored (p. 124)

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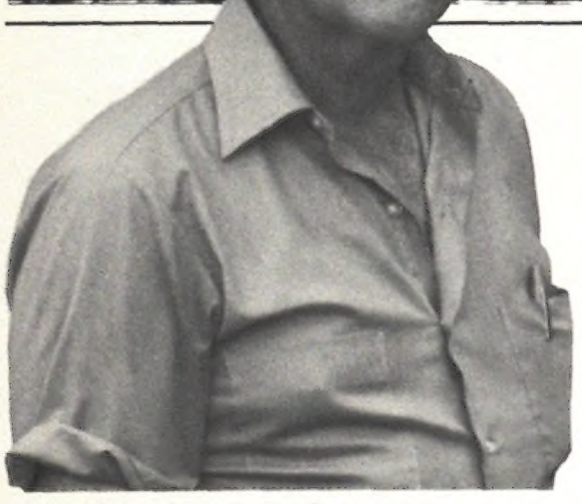

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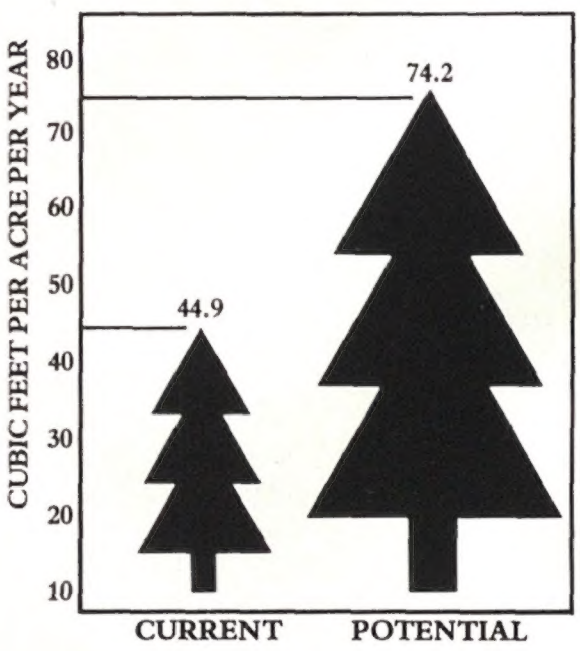

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November 1981

Smithsonian

Volume 12, Number 8

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Smithsonian (ISSN 0037-7333) is published monthly
by the Smithsonian Associates, 900 Jefferson Drive, Washington, D.C. 20560.
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Subscription price $14 a year in U.S. possessions, $22 elsewhere.
Single copy price $1.25. Second-class postage paid at Washington, D.C.
Editorial offices, 900 Jefferson Drive, Washington, D.C. 20560.
Advertising and circulation offices at 420 Lexington Ave., New York, New York 10170.
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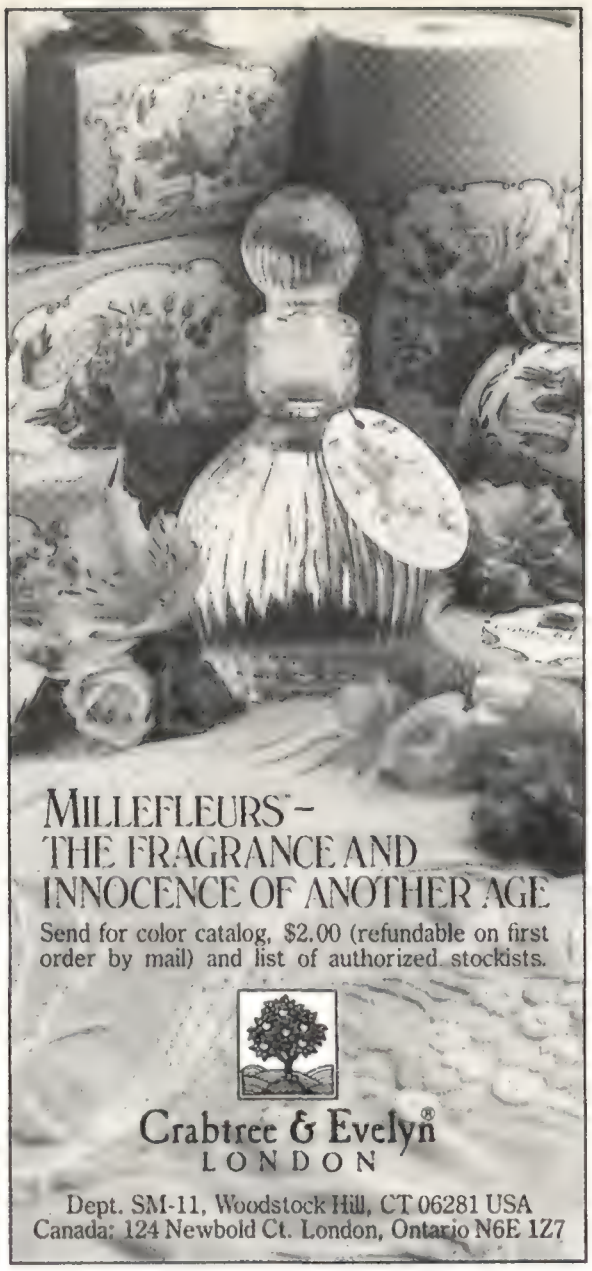

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Secretary Ripley's comments

The view from the castle

The death of our great benefactor reminds us of how much the Hirshhorn Museum has enriched the nation and the Institution

Joseph H. Hirshhorn died on August 31, less than three weeks after his 82nd birthday. To me the event was incomprehensible, and I am sure to his friends also. It was unthinkable that my old friend Joe would not help to preside at my own funeral. Joe could dance better than I could. He was young and merry in heart. He was curious and passionate and humane. He exemplified Jonathan Swift's observation that "Every man desires to live long, but no man would be old." I could not imagine him old.

I first met Mr. Hirshhorn in 1964, not long after I came to the Smithsonian. One of my own passions was to make up, somehow, for generations of neglect which seemed to proscribe forever the possibility of the Institution's catching up with the present in the field of art. In 1938 Congress had instructed the Regents and the administration to encourage contemporary artists, give scholarships, and create a modern art museum on the Mall. Perhaps this unusual language had been inspired by the example of New York, which was pioneering with two museums—the Museum of Modern Art and the Whitney Museum of American Art. But Washington in 1939-40 was a different place; and although the Smithsonian did hold a competition for a new building for modern art, won eventually by Eliel and Eero Saarinen, the design was quietly shelved by those whose dictum seemed to be "Let no touch of modernity ever sully the Mall!"

But the 1960s were full of vigor, if not daring. And it was then that contemporary art galleries were springing up all over the country, even in Washington. The poor Smithsonian, if it ever was to catch up, must find a collection already made. Joe Hirshhorn had been collecting with unimaginable personal zeal and competence for 35 years in the field of contemporary sculpture and painting. He was a megacollector who already possessed more than 5,000 objects. He was happy with his collection, in the prime of life, and seemed an unlikely candidate for a donation to the Smithsonian.

If I ever thought so, I was soon disabused. To me Mr. Hirshhorn seemed utterly realistic, as well as curious. Why had I come to see him, when he was so happy with his "children," as he called them, surrounding him in every nook and cranny? Of course, underneath, he was concerned about his "children's" fate. He had already been approached by three other nations and some cities. He knew little of Washington and, a common failing, even less about the Smithsonian.

But Joseph Hirshhorn was a patriot. His remarkable "Horatio Alger" career had instilled that in him, along with his essential honesty and decency. Of course he would think about it. Joe and his lovely wife, Olga, and ourselves became fast friends. Together we helped President and Mrs. Johnson and the Congress to understand that this extraordinary man could do something for the Institution, for Washington and for the nation. Thus the Hirshhorn Museum and Sculpture Garden was born.

Now, in death as in life, he has continued to add to his unparalleled gift with additional works of art, with a generous endowment for acquisitions, and with an unforgettable memory of his joy in life.

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Letters to the Editor

Falkland Islands

Dear Sir: Fred Strebeigh's article on the Falkland Islands in your September issue brought back many memories. I was born there, at Fox Bay East, managed by my father, Hubert Cobb, and spent the first ten years of my life in the Islands. My grandfathers, George Cobb and Edward Goddard, had each managed the Falkland Islands Company in their lifetimes.

It was an enjoyable, carefree life. Travel was entirely on horseback with a packhorse to carry luggage. On reaching a river we simply swam the horses across. The Luxtons at Chartres were family friends. Connie still writes my mother.

It was a great life, but it ended when my parents decided to return to England so my brother, sister and I could continue our education (the traveling schoolmaster came to visit our home for only a few days every three months).

Joan Getz
Morton, Illinois

Dear Sir: I am younger than my sister, Joan Getz, but my own memories of the Falklands are of a lighthearted, timeless existence. I spent my days on horseback, which I loved—and my brother despised. As we were inseparable, he spent a lot of time doing something he hated so we could do things together—such as taking a picnic packed by our cook and riding for miles to find a cave above the beach in which to eat our lunch. The only things that frightened me were the seals that were always lounging on the beaches. I think my fear came from the horses, who were absolutely terrified of them. I remember boiled penguin eggs for break-

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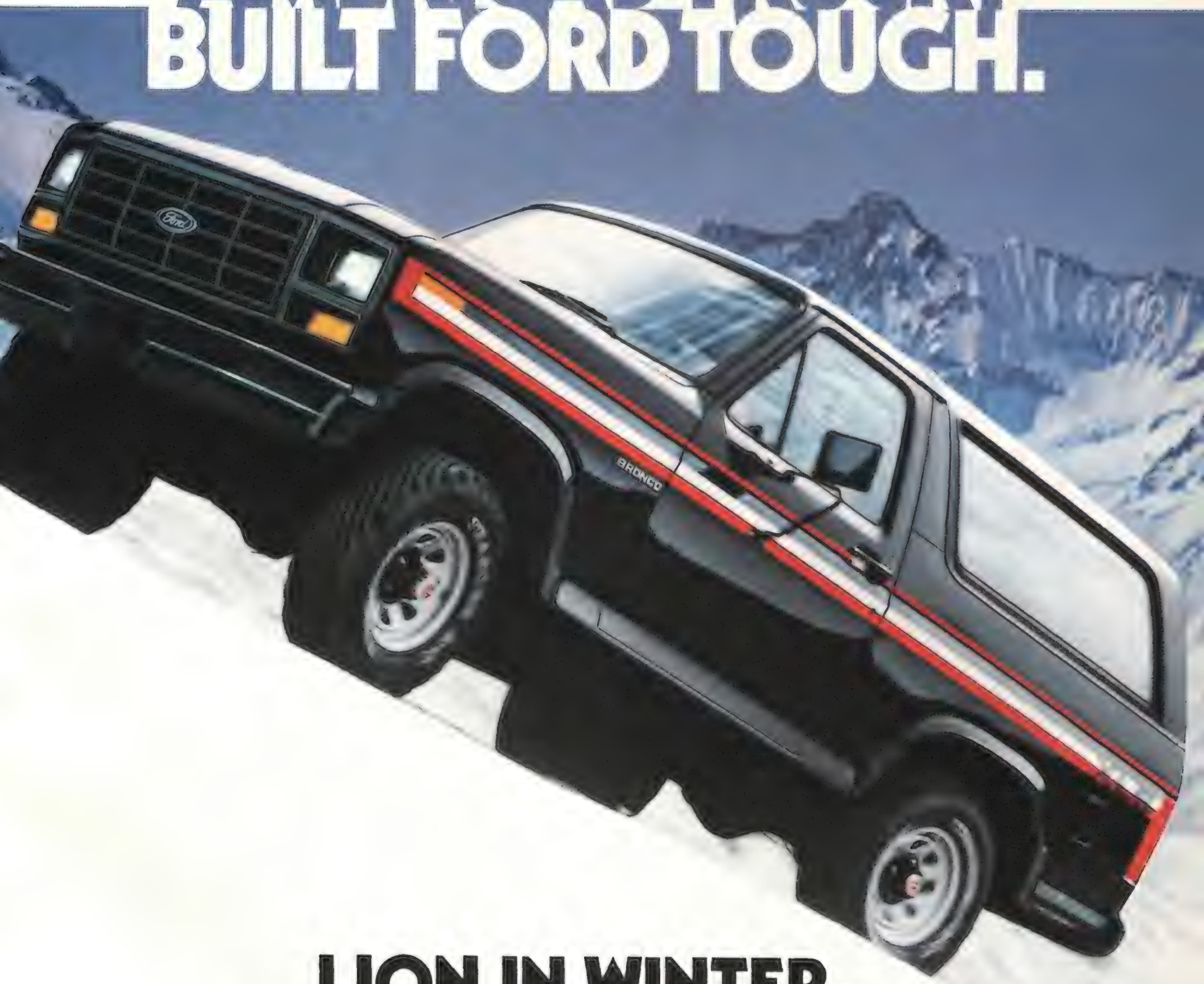

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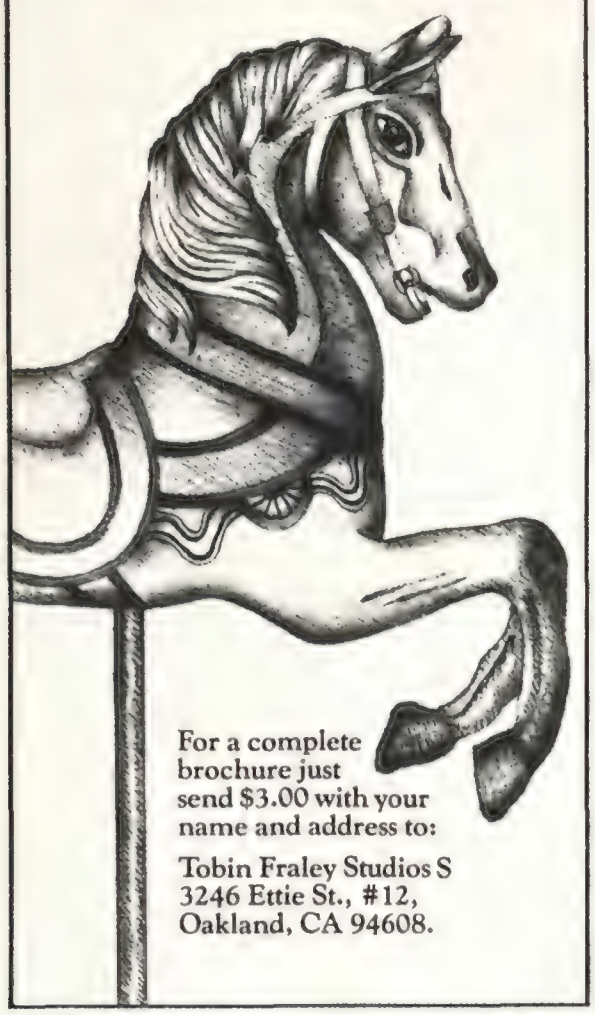

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fast. They were too big for eggcups and had to be put in napkin rings. I shall always regret having to leave the Islands. Today we could fly back and forth to school, but in 1936 the only route "home" was a six weeks' journey by boat.

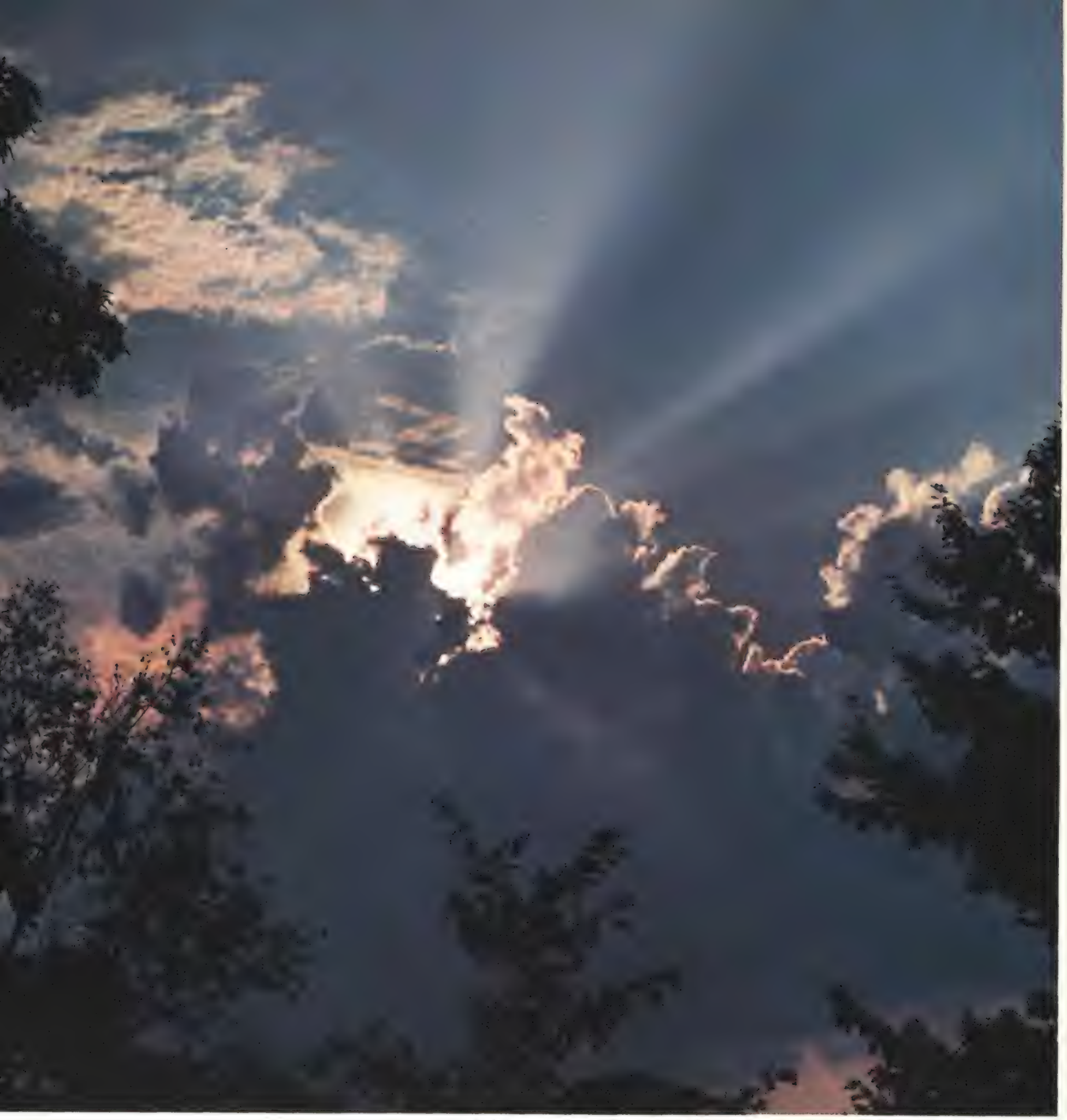
Ursula Coulson
Leesburg, Virginia

Dear Sir: I was overwhelmed by the beautiful photographs of the Falkland Islands. It truly is a special place, and I marveled at those dramatic skies and colorful vistas. Looking at the pictures, I marveled even more that this appeared to be an island without women. But the text tells me women do live there. Why were we not permitted to see them? The anthropologically inclined among us propose hypotheses for their omission: 1) they are afraid of cameras, 2) they are too beautiful for mortal eyes to view in print, 3) they are too ugly for mortal eyes to view in print, 4) they look like everybody else only more so, 5) they were all vacationing in Rio, 6) they were all busy shearing sheep and no one remembered to give them time to freshen up for the photographer, 7) they are so tired of sheep that the Islanders fear they will run off with any visitors, 8) they wanted to know if anyone would miss them.

Please tell them I did.

Laurie Caplan
Englewood, Colorado

Not only women, but weddings, are alive and well in the Falklands. Here, Stanley Girls Brigade is Honor Guard. And the



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young horsewoman shown on the last page of our article leads her male companion by half a length. Ed.

Latter-day Icarus

Dear Sir: As a solar consultant, I am all too familiar with essays extolling the virtues of solar energy. It seems that sun power has become the victim of media-hype, which promotes it as the free lunch we've been waiting for. It is refreshing to run across an article that takes a more practical approach.

However, many of the problems mentioned (leaks, high-priced plumbers, etc.) could be avoided through the use of air rather than water as the transfer fluid. For several years the solar industry has been moving toward forced-air systems and I'm surprised that the author made no reference to this. Also, incompetent workmen and inspectors, high-pressure salesmen and outright charlatans have plagued the human race since goods and services began. Knowledge of the product is still the consumer's best defense.

Les Daly's inference that the technology is not sufficiently advanced for residential retrofitting is misleading. Few existing homes have the space for a full-sized solar system. Nevertheless, there are smaller supplemental units that can be retrofitted quickly, inexpensively and, most important, successfully. My own 110-year-old house has such a system and it does not "look like a spaceship." By cutting my family's dependence on fossil fuels, I am taking a positive step toward better stewardship of the Earth.

Brian Joyce
Oxford, Ohio

Dear Sir: Les Daly's article was completely unrealistic. With our own research, common sense and hands, we built a solar system that works so well that the first modification was to put a temperature-limiting mechanism on it to keep the water from getting hotter than the building code allows. As far as we are concerned, solar household heating and hot water is here now, and economically advantageous. We take joy in knowing we aren't adding to the pollution in our neighborhood. We built our solar system, it works, and it makes environmental and dollar sense!

Burt and Mary Andrus
Long Beach, California

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Dear Sir: I was greatly disappointed in your anecdotal indictment of the solar industry. The unequivocal message is that solar is not practical for anyone unwilling to spend the $55,000 needed for a non-functional hot-water heater. Nonsense.

Solar is a tried and proven energy technology. Thousands of solar systems in this country have a record of reliability and economy. Beginning in September 1980, the Solar Energy Research Institute conducted a national survey of 3,800 solar homeowners. An impressive 89 percent of the respondents stated they were satisfied with their experiences as solar owners. The great majority further responded that they either encountered no problems with their solar systems or that the few problems were satisfactorily resolved.

Alan P. Cleveland
Manchester, New Hampshire

Postcards

Dear Sir: In regard to your article on postcards, I doubt that the bewigged hound is either a pet owner's fantasy or a bad joke. He was most likely a member of a well-known troupe of performing dogs that appeared in circuses and music halls throughout Europe at the turn of the century. Among such routines as a doggy funeral and a boxing match, a fire brigade and a rescue, the act featured a musical specialty: a serpentine dance performed by one of the dogs. It was a parody of the popular dance innovator Loïe Fuller [below], who manipulated filmy fabrics with wands, surrounded by multicolored lights. Her act was so well known that any audience of the time would have caught the satiric allusion.

Laurence Senelick
Medford, Massachusetts

Edward Lear

Dear Sir: With reference to Lear's owl, I offer the following:

A mistake very silly and 'fowl'
E. Lear did to the toes of that owl.
They should be zygodactyl,
But look so unnat'ral,
They would change every hoot to a howl!

Robert P. Cutler
Winnetka, Illinois

We consulted our resident owl, whose toes did not seem to be arranged two to the front, two to the rear. When this lapse in zygodactylic behavior was pointed out to him, he replied:

We old owls and the fish-eating osprey
Grasp perches and victims in this way:
With outer fourth toe turned forward or aft
Depending on needs of raptorial craft.

Dear Sir: Joseph Kastner's article on the life and works of Edward Lear justly gives

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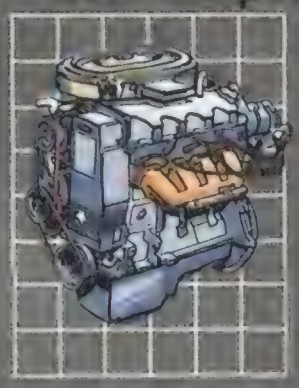

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and temperature. You'll know the time. You'll even know the sports scores if you turn on the AM radio, because that's standard, too. (May be deleted for credit.) A special warning light will even tell you if your door is ajar.

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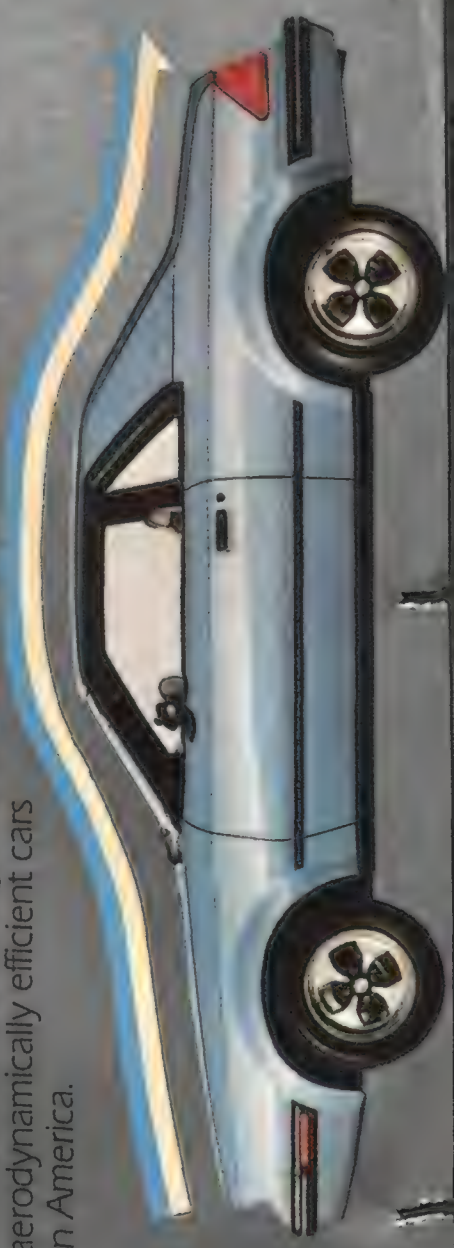
While EXP's styling will get heads turning your way, the dramatic fluid shape was born to slice through the wind. Ford engineers created one of the most aerodynamically efficient cars in America.



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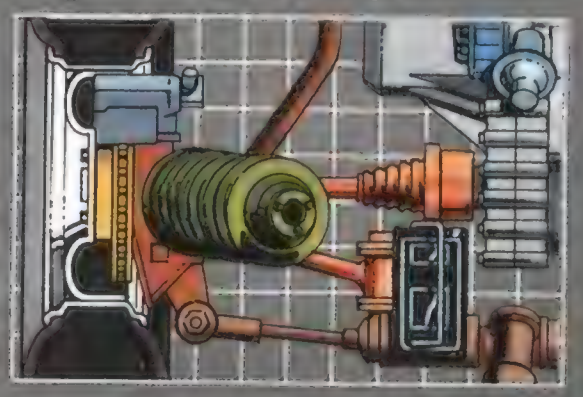

EXP's front-wheel drive, four-wheel fully independent suspension and front stabilizer bar are specially tuned for sporty handling. Combine that with EXP's rack and pinion steering, standard power front disc brakes and sport close-ratio transmission option and you'll get a whole new appreciation for the street where you live. Whether you buy or lease, see EXP at your Ford Dealer now.

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him his due as a great artist and delineator of animals. Lear's limericks, however, are often overrated. Many others, before and after him, have written better ones.

Mr. Kastner states that "such poems were known in England around 1820." Actually, the limerick has been around much longer. Gershon Legman, in a scholarly introduction to his book, *The Limerick*, cites a distinct limerick from an early 14th-century manuscript, and the limerick form appears again in the songs of the Bedlams, the mad English "mumpers" of the 16th century. There is also the long oral tradition of limerick verses in tavern drinking songs.

Eugene C. Bovee
Lawrence, Kansas

Kellogg, Idaho

Dear Sir: The article by Cassandra Tate on pollution problems in Kellogg, Idaho, in my opinion, is not objective. As to lead, who is to say that federal lead standards are proper? The Bunker Hill Company's smelter has been emitting lead into the air for decades, but Kellogg's people have not been dying like flies from lead poisoning. Those same stack emissions, uncontrolled by today's standards, have not produced generations of children subject to brain damage, convulsions and coma.

Before your article appeared Bunker Hill announced the closing of the lead smelter and the zinc refinery, citing increased costs with resulting losses as the reason. They may have been forced to spend on pollution control far in excess of safety needs.

Gene K. Ealy, Vice President
Hecla Mining Company
Wallace, Idaho

Hollywood palaces

Dear Sir: Prince George of England, the Duke of Kent, did not, as your article stated, become King George VI. The youngest of King George V's four surviving sons, he was an officer in the RAF when killed in a plane crash in Scotland during World War II. The second son, Albert Frederick Arthur George, Duke of York, was crowned King George VI when he ascended the throne on the abdication of the proclaimed, but never crowned, Edward VIII (later, Duke of Windsor).

P. W. Manchester
Cincinnati

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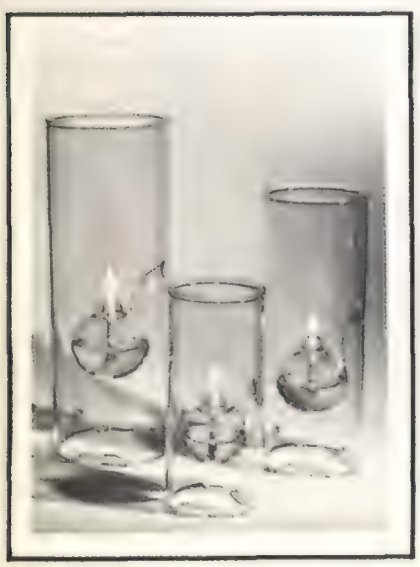

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S81

Computer games

Dear Sir: We greatly enjoyed the article on video games. We feel, however, that we must disagree with Dona, the female designer of the new Atari game *Centipede*, who described it as "a woman's game . . . a nice game." Sorry. Any game in which your slightest miscalculation will result in being devoured by horrible, slobbering Arthropods is most definitely a *man's* game. As 27-year-olds playing in the same arcades as super-reflexed ten-year-olds, we have enough problems without worrying about our masculinity.

Thomas C. Rainbow
Michael D. Gessel
New York City

Around the Mall

Dear Sir: I was at Yorktown 50 years ago, at age six. My father was a construction superintendent who built, among other things, the revolving stage. Our whole family stayed with my grandparents in Newport News and went to the celebration every day. I remember the cannons firing, and seeing Hoover, Roosevelt, Pétain—and going aboard *Old Ironsides*.

Father bought each of us children a medal and told us, jokingly, to wear it back in 50 years and they would let us in free. I intend to go back. Those 50 years have rolled by mighty fast.

Thomas M. Martin
Bedford, Virginia

Dear Sir: "Lafayette, we are here" should not have been attributed to General John J. Pershing but to Colonel Charles E. Stanton, chief disbursing officer of the American Expeditionary Force in France in 1917, whom Pershing had deputed to make the address at Lafayette's tomb.

Hugh B. McManus jr.
Redlands, California

Crosswords

Dear Sir: Richard Wolkomir need not puzzle over a "six-letter word for 'extinct South African relative of the Zebra.'" The answer is "quagga." This timid animal became extinct in 1883, when the last mare died in the Amsterdam zoo. The word may be derived from a Bantu name —or from the animal's barking call.

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Around the Mall and beyond

The National Zoo's Conservation and Research Center at Front Royal, Virginia, is surely a delectable Eden for the exotic and endangered animals that roam its hilly acres. It's something else, too: about 3,000 acres that include choice meadow and woodland in the Blue Ridge—a swatch of beautiful land, rich in history, beloved by the people who live around it and certainly the familiar range of native species varying from wood mice to black bear and white-tailed deer (SMITHSONIAN, January 1980).

To see how this fauna is making out—how Virginia animals get along with Chinese deer and Persian wild asses and European bison, how their ranges are affected by new roads and houses springing up in the Front Royal area—Smithsonian people have been catching a few, fitting them with radio transmitters, turning them loose and then tracking them by radio signals. Dr. John Seidensticker, coordinator of the project, has welcomed visiting scientists from other nations who find the Smithsonian facility perfect for their own specific purposes. A pair of Germans, for example, came to Front Royal to study the movements of a bobcat over a series of 48-hour periods—how much ground it covered, what places it visited, and in what order. They trapped a bobcat, fitted it out, turned it loose and spent six weeks on eight-hour shifts, day and night, to get their answers.

Dr. Seidensticker also welcomed me, and sent me out to play with Dr. A. J. T. Johnsingh from India. He was set to track some raccoons which had been caught and now were transmitting away while they went about their business.

We boarded a Jeep and bounced down a spring-busting track in a section of the

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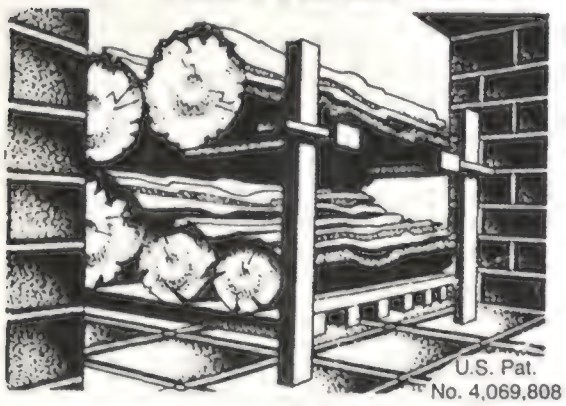

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For full scientific description, see L. Cranberg, Am. Jour. Physics, June '81. Reprints on request.

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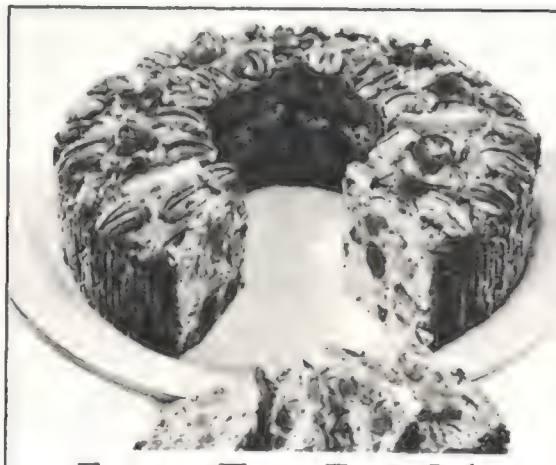

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Center called Posey Hollow. Thick hardwood forest. Hilly. A few streams, all running because it had barely stopped raining. Pretty soggy underfoot.

Johnsingh stopped, produced a leather-bound radio receiver and earphones, and a directional antenna. He tuned in a frequency, raised the antenna and slowly turned around in a circle. Then he handed the gear over to me. I heard a steady "beep, beep, beep" which, as I turned, suddenly came in very loud. The direction was perfectly clear: *that* way, somewhere in that clump of trees, was the raccoon in question.

We rattled on around a corner in the trail and then stopped again. Again we both turned with the antenna held high, and again agreed on a direction from which the signal was strongest. By taking compass bearings at the two positions we tested, we would have triangulated our target and presumably could have moved in on it.

Johnsingh's project has been to study the foraging strategy of raccoons—where they eat and sleep, how far they wander, how fast they move, how they differ from opossums, which have also been radio tagged. About four times a month he had been tracking selected transmitting animals over a 24-hour period.

He learned that, at Front Royal, the raccoons move about less than in areas less rich in forage. They move generally to different areas each night, then return to their own home ground. They can move fast. When you track several a night, each with its own frequency, you get to know them. They're easy to catch the first time.

"Easy to catch" sounded hopeful for the early morning activity, which was to check the traps, bring the animals back to the lab, fit their little tailor-made collars on them, then take them back and release them.

I arrived at the lab at six the next morning—a fresh, chilly morning with huge stars snapping in the clear sky. I gulped coffee gratefully, then at first light joined Seidensticker's assistant, Greg Sanders, in his four-wheel-drive vehicle, a relic from some ancient war, held together only by the genius of Front Royal's mechanics. We lurched off into the dawn.

Now, I'll admit that at this time I was aware of the old "You-should-have-been-here-last-week" syndrome. I all too often fall prey to it. "Rainbow trout? Boy, you

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should have been here last week!" "Canada geese? Last Tuesday was the time for them! Whew!" "Changing guard at Buckingham Palace? You should have seen them yesterday when the sun was out!"

When Seidensticker, plunging along in another war-weary Jeep, indicated that on a fine, bright, rain-washed morning like this we would surely find raccoons and opossums and maybe a bobcat and maybe a fox, a small voice deep inside me whispered, "Maybe not." But his confidence was catching. We bounced up to the first three or four traps, all empty, and just laughed it off. Greg splattered fresh bait inside. Rather antiquated mackerel. I filled in the coded report, designed to feed some omniscient computer

Very young bobcat, uncertain about its future, is radio tagged at Front Royal.

and so provide lasting information about the doings of the mammal population of Posey Hollow that day. I remember "04" indicated the bait. The box traps were "207" or "208," depending on size. A simple "1" in the proper place meant that the trap was empty.

I got very good at writing "1." We spent three hours in four-wheel drive, staggering up impossible grades and reeling drunkenly down again, hanging onto the ruts grimly along sidehill stretches that seemed designed to capsize a mountain goat. We covered about seven miles in all, checking 38 traps. I noted "1" 36 times and "32" twice. Thirty-two stood for box turtle. John and Greg agreed this was the worst day they had ever seen, that it was simply impossible not to snag just one lousy raccoon, that I should have been there last week. I nodded quietly, pleased with myself for having become the box turtle king of Front Royal.

There may have been no animals, but there was a wealth of stories about them, and the project. I don't believe a word of them, mind you, but I'll pass them along.

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The group got one black bear which, according to its subsequent signal, uses the Smithsonian property as part of its range. Since the Center abuts Blue Ridge National Parkway in two places, the bear has plenty of room to wander around in—all of it protected. Other bears have been seen besides the marked one. They follow trails or power-line clearings where blackberries grow.

Bobcats are usually too smart to get caught. One young one got into a raccoon trap. One raccoon was found spread-eagled on the floor of a trap in an attitude of total panic. Since the animals are not *that* frightened of humans, Greg took a careful look around the trap and found the fresh tracks of a big bobcat which obviously thought he had breakfast all lined up for that morning.

The raccoons are just as smart as all the stories about them indicate. They'll tip over a trap and shake the bait out of it or reach their little "hands" in to the bait from the outside. Opossums are stupid. As the scientists say, they play with a third of a deck.

Raccoons will fool you, though, by sometimes getting caught in dumb ways. Greg said he found two males together in adjoining traps. "They'd gone out for a couple of beers and got into trouble," said Greg, who is not a bit terrified of anthropomorphism. Another trap held a female with one of her young still outside, unwilling to leave Mom. When Greg picked it up by the scruff of its neck it screamed. "It screamed so loud I almost dropped it," said Greg. "I felt like a child molester. I thought the cops would come any minute."

Great stories. The guys at Front Royal probably sit around and make them up by the hour. But now, when it comes to box turtles. . . .

Front Royal is a beautiful place, rewarding in a hundred ways, but you really need two days to join a program like that at the Center. However, when the Insect Zoo back at the Museum of Natural History puts on a safari, as they call a live insect collecting trip, it is generally close to Washington and doesn't require the same planning and organization. I signed on with one insect hunt and within ten minutes of my office was twisting through brambles and tall, rank grasses near the bank of the Potomac. Moths fluttered out of my path, hoppers hopped, bumblebees

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Power. Dignity. Authenticity. The Colt .45 Peacemaker embodies all these. It is also a work of strength and authority that bespeaks the traditions of the Old West. A work you will be proud to display in your office or home, or to present as a very special gift.

Take note, however, that the order form at right is valid only until November 30, 1981. To acquire this outstanding work, be sure to mail this form to The Franklin Mint, Franklin Center, Pennsylvania 19091, on or before that date.

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buzzed and ladybugs flew away home.

Wendy Shay of the Insect Zoo was chief bwana of this safari. The rest of us were simply bearers. No nonsense about us. First names; not last names. No time to make up descriptive sentences.

Wendy handed out three nets. One aquatic, one aerial, one a sweep net which you zing through the tall grass and then peer into to see what you reaped. Don't use one to do a job that another is supposed to do, said Wendy. Going after a water spider with an aerial makes the net muddy. Trouble is, when you see an insect that's nettable you swipe away with whatever's at hand.

Spotted a web that looked as though it had a zipper in it. "Argiope spider," said Wendy. We didn't bother with it. Headed for tall grass. "Let's fan out and sweep," said Cathy. We did. Came to some logs. Cleve produced a hatchet and we chipped away bark. Found sow bugs. They're crustaceans, same as lobsters. Left them alone. Wendy said we were looking for camouflaged insects.

Found treehopper. Cathy got it into jar with punctured lid. Michael found another hopper. Looked it up in a book. Leafhopper. Kept it. Both are related to cicadas. Gail copped a tortoise beetle. Let it go. Snagged a young praying mantis. These introduced from Europe, says book. Name: *Mantis religiosa*. Had to go into solitary confinement or else would eat its cell mates.

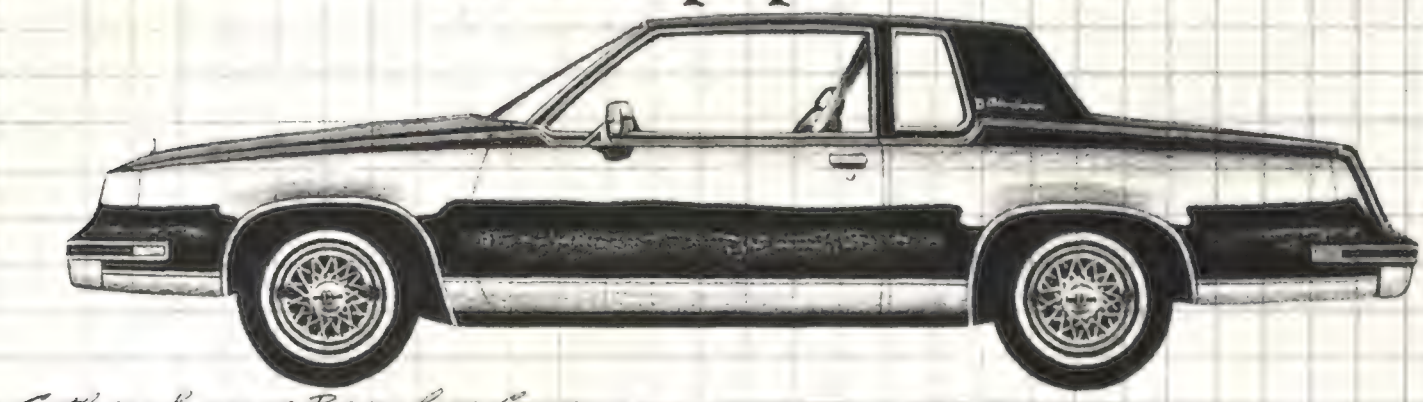
Hot, still day, except for planes taking off from National Airport. Rested in glade in woods. Empty can of TruAde. Rain started to fall. Wendy said, we might as well go. "The insects stop moving," she said. "You can't find any. When the rain stops they'll come out again."

The rain didn't stop, so we left. Back at the office I became aware of small movements inside my shirt. Explored. One ladybug and one leafhopper. Not bad for a bearer without a sweep net.

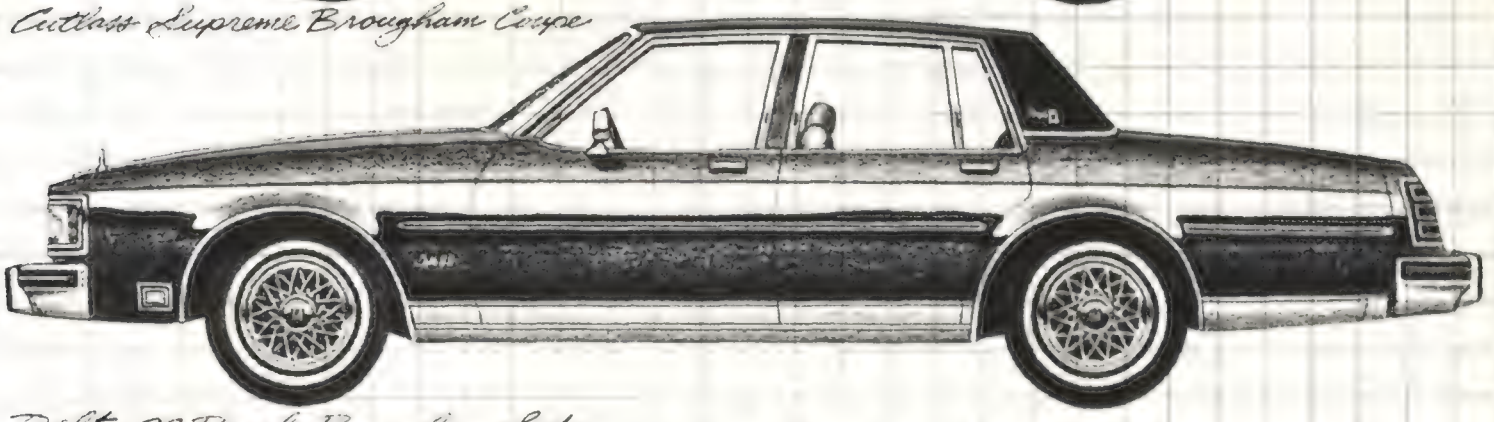
November is springtime in Australia, and so a proper month for an international sports event that may intrigue many Smithsonian addicts. For the past 13 years we have had a boomerang tournament on the Mall, run by our old friend and former staff member, Ben Ruhe, who knows more about boomerangs than most Aboriginals in Australia's Outback.

Now Ben has put together a 12-person team of American boomerang experts

Diesels.
How did Oldsmobile make them so popular? They put them in popular cars.



Cutlass Supreme Brougham Coupe

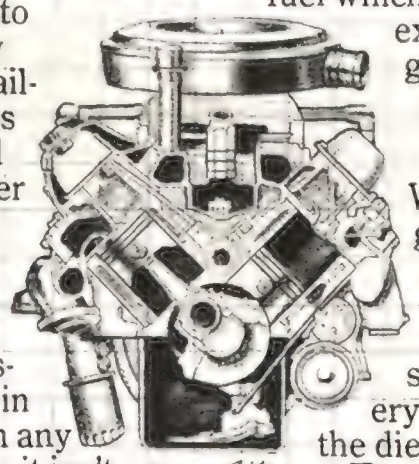


Delta 88 Royale Brougham Sedan

In 1977, Oldsmobile made an innovative move. They introduced the first American cars with available diesel V8 power. Now, with over 387,000 diesel Oldsmobiles on the road, Oldsmobile is the number one seller of diesels in America, and diesel Oldsmobile popularity keeps growing.

A new diesel V6 for 1982.

The number of diesel engines available in Oldsmobiles is growing, too. In addition to the diesel V8, a new diesel V6 is now available for 1982 Cutlass Supreme Coupe and Sedan models to offer a great combination of high mileage and high style.



5.7-liter diesel V8

Altogether, more diesel-powered Oldsmobiles will be sold in the next year than in any year in the past. But, it isn't just because there will be so many diesel Oldsmobile models to choose from. Or even because of the impressive diesel engineering advances, like the Fast-Start Glow Plug System, roller hydraulic lifters and the inherent smoothness of the V-type design.

It's because diesel Oldsmobiles offer some very basic and important things people want.

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Diesel Oldsmobiles offer comparable fuel economy to that of many smaller cars and a cruising range few can match. All on diesel fuel which is traditionally less expensive than unleaded gasoline.

Added value at resale.

While it may vary by geographic location, many used car guides indicate that current resale prices, averaged out, show a substantial recovery of the original cost of the diesel option.

Room. Comfort. And style.

We could get more technical. But let's face it. What really counts is what a diesel does. Not what it is. And what a diesel does in an Oldsmobile is to give you roomy, comfortable and stylish alternatives to the proposition of making very practical choices. So that even today, there's still room to do it with style.

GM

Diesel mileage estimates.

MODELS		Fuel Tank Cap.	Est. Hwy.	Est. Hwy. Range	EPA Est. MPG	Est. Range
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Cutlass Supreme	(V8)	19.8	34	673	23	455
Cutlass Cruiser	(V8)	18.2	34	618	23	418
Delta 88	(V8)	26.0	34	884	23	598
Ninety-Eight	(V8)	26.0	33	858	22	572
Custom Cruiser	(V8)	22.0	33	726	22	484
Toronado	(V8)	22.8	36	820	21	478

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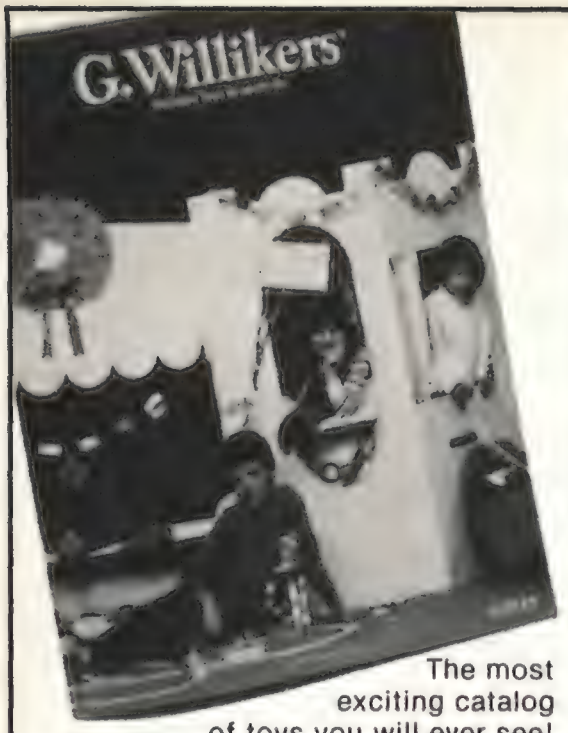

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and is leading them to Australia for a tour—Melbourne in Victoria, Albury and Sydney in New South Wales and Brisbane in Queensland—for seven matches, four with state teams and three with a national team. The Pacific Museum of Flight in Seattle, scheduled to open next year, is the sponsor. Boomerangs, after all, are closely tied to the idea of flight, since they make use of the same airfoils that keep a plane aloft, only slightly contorted to produce those special boomerang characteristics.

The matches and demonstrations will involve long-distance competition, doubling—that means heaving out two boomerangs at once and then catching both of them when they come whistling back to you—juggling, which is throwing and catching two so that one is always in the air, an endurance test to see how long a thrower can keep a boomerang spinning around in the air with just one mighty heave, things like that. Ben Ruhe can do them all, having learned how while he was in Australia as a young man.

Ruhe retains his Smithsonian connection by being honorary consultant on boomerangs to the National Air and Space Museum. The manager of the team, Alison Fujino of Seattle, is also a Smithsonian alumna.

The American team is carefully selected, highly proficient and out to win the Gerrish Trophy, named for a boomerang collector and presented by his widow. A lot of other boomerang buffs have contributed to this first international match, including, of course, a number of Australians on both sides of the Pacific.

Predictably, too, the Aussies, who are nothing if not feisty when it comes to competition, foresee overwhelming victory for their homegrown boomerang heavers. Neville Bonner of Queensland, Australia's only Aboriginal senator, states for quotation that "an Australian team composed of 50 percent Aboriginals could beat the socks off a team of Yanks."

Sockless or not, the Yanks will have a very good time in Australia, and that—though we often forget it—is what sport is supposed to be about.

If you want to learn more about boomerangs, read Ben Ruhe's book, *Many Happy Returns* (Viking-Penguin). And come on out to the Mall next June to have a fling with the champs at the annual Smithsonian meet.

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Phenomena, comment and notes

When a scientist's work is blended into the whole, what remains of the human being behind the results?

I was somewhat embarrassed not so long ago when I opened a year-old physics journal and read that two Japanese fellows had attacked the same problem I was currently finishing up, obtaining an identical solution. The problem, not so consequential now as I reflect stoically on my preempted calculations, concerned the spatial distribution that would eventually be achieved by a group of particles of different masses, interacting with each other by gravity.

The underlying theories of gravity and of thermodynamics necessary for solving such a problem are certainly well established, so I suppose I should not have been surprised to find that someone else had arrived at similar results. Still, my pulse raced as I sat with my notebook and checked off each digit of their answers, in exact agreement with mine to four decimal places.

After doing science for a number of years, one has the overwhelming feeling that there exists some objective reality outside ourselves, that various discoveries are waiting fully formed, like plums to be picked. If one scientist doesn't pick a certain plum, the next one will. It is an eerie sensation.

The objective aspect of science is a pillar of strength and, at the same time, somewhat dehumanizing. The very usefulness of science is that individual accomplishments become calibrated, dry-cleaned and standardized. Experimental results are considered valid only if they are reproducible; theoretical ideas are powerful only if they can be generalized and distilled into abstract, disembodied equations.

That there are often several different routes to a particular result is taken as an indication of the correctness of the result, rather than of the capacity for individual expression in science. And always there is the continual synthesis, the blending of successive results and ideas, in which individual contributions dissolve into the whole. Such strength is awesome and reassuring; it would be a tricky business to land a man on the moon if the space ship's trajectory depended on the mood of the astronauts, or if the moon were always hurrying off to some unknown appointment.

For these same reasons, however, science offers little comfort to anyone who aches to leave behind a personal message in his work, his own little poem or haunting sonata. Einstein is attributed with the

statement that even had Newton or Leibniz never lived, the world would have had the calculus, but if Beethoven had not lived, we would never have had the C-Minor Symphony.

A typical example of scientific development lies in the work of the German physicist Georg Simon Ohm (1789-1854). Ohm was no Einstein or Newton, but did some good, solid work in the theory of electricity. Coming from a poor family, Ohm eagerly learned mathematics, physics and philosophy from his father. Most of Ohm's important research was done in the period 1823-1827, while he was grudgingly employed as a high school teacher in Cologne. Fortunately, the school had a well-equipped physics laboratory. In 1820 Hans Christian Oersted had discovered that an electric current in a wire could affect a magnetic compass needle, and this development impassioned Ohm to begin work in the subject. In those days electrical equipment was clumsy and primitive. Chemical batteries, invented in 1800 by Alessandro Volta and known as "voltaic piles," were messy affairs, consisting of ten or more pairs of silver or copper and zinc disks separated by layers of moist cardboard. Ohm connected a wire to each pole of a voltaic pile and suspended above one of the wires a magnetic needle on a torsion spring. This was a crude device, operating on Oersted's principles, which could measure the current flowing through a wire. Ohm then completed the circuit by inserting test wires of various thicknesses and lengths between the two battery leads, measuring how the current changed and depended on the properties, or "resistance," of each test wire.

This initial work was done inductively by the seat of the pants. Ohm published his results in a semi-empirical form, smacking of the flavor of the laboratory. Some of the quantitative expressions of experimental data in the first paper in 1825 are actually slightly incorrect. This was soon to be rectified, however, for Ohm was enamored of the elegant and mathematical work of Jean Fourier on heat conduction and recognized some striking similarities to current flows. Under this influence Ohm further developed and recast his results into more general mathematical expressions, not exactly matching his data but cleaving to the analogies with Fourier's work, a creative and crucial step.

The final results, stating in part that the current is directly proportional to voltage and inversely proportional to resistance (now universally known as Ohm's Law), were codified in an abstract and well-manicured paper published in 1827, very distant from those late nights with jumbles of wires and repeated exhortations to the voltaic pile to hold steady on the voltage.

When the complete theory of electromagnetism was assembled by James Clerk Maxwell in 1864, Ohm's work was deftly stitched in, like a portion of a giant tapestry. In 1900 Paul Drude published the first microscopic theory of resistance in metals, giving at last a satisfying theoretical understanding of Ohm's Law. Today we use Ohm's Law routinely in designing electrical circuits, in calculating how deep a radio wave will penetrate into the ocean, and so on. But there is little of Ohm in the abstract statement $V=IR$ (voltage equals current times resistance).

Max Delbrück, the late physicist-

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Georg Simon Ohm: today we use his law routinely but the man is largely forgotten.

turned-biologist, said in his Nobel Prize address, "A scientist's message is not devoid of universality, but its universality is disembodied and anonymous. While the artist's communication is linked forever with its original form, that of the scientist is modified, amplified, fused with the ideas and results of others and melts into the stream of knowledge and ideas which forms our culture." Perhaps if Georg Ohm had been a painter or a poet, we would now be celebrating his leaky voltaic pile, his uncalibrated galvanometer, his exact arrangement of odd wires and mercury bowls, or reliving the loneliness of his bachelor nights, his emotions and thoughts during the experiments.

It seems to me that in both science and art we are trying desperately to connect with something—this is how we achieve universality. In art, that something is people, their experiences and sensitivities. In science, that something is nature, the physical world and physical laws. Sometimes we dial the wrong phone number and are later found out. Ptolemy's theory of the solar system, in which the sun and planets revolve about the Earth in cycles and cycles within cycles, is imaginative, ingenious, and even beautiful—but physically wrong. Virtually unquestioned for centuries, it was ungracefully detonated like a condemned building as soon as Copernicus came along.

Very well. Scientists will forever have

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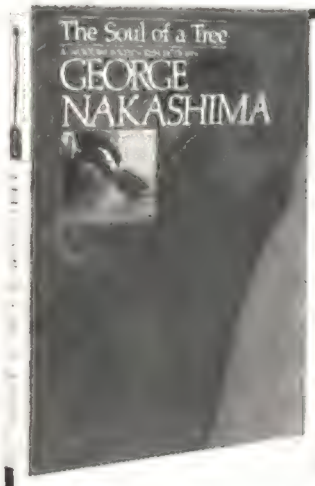

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to live with the fact that their product is, in the end, impersonal. But scientists want to be understood as people. Go to any of the numerous scientific conferences each year in biology or chemistry or physics, and you will see a wonderful community of people chitchatting in the hallways, holding forth delightedly at the blackboard, or loudly interrupting each other during lectures with relevant and irrelevant remarks. It can hardly be argued that such in-the-flesh gatherings are necessary for communication of scientific knowledge these days, with the asphyxiating crush of academic journals and the push-button ease of telephone calls.

The frantic attendance at scientific conferences has been referred to as a defense of scientific territoriality, a dead giveaway to our earthy construction. I think it is this and more. It is here, and not in equations, however correct, that we scientists can express our personalities to our colleagues, relish an appreciative smile, speculate on the amount of Carl Sagan's latest advance, and exchange names of favorite restaurants. Sometimes I enjoy this as much as the science.

Alan P. Lightman
Astrophysicist, Harvard-Smithsonian Center for Astrophysics

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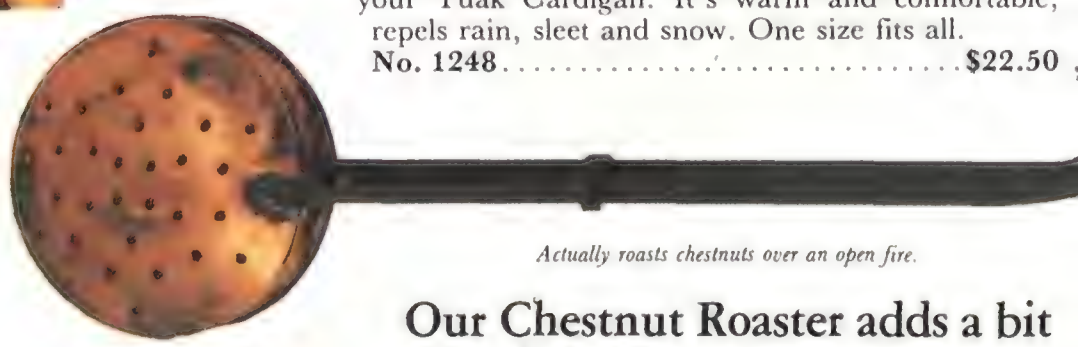

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4'10"										
5'0"										
5'2"										
5'4"										
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By Patrick Young

Thick layers of life blanket lake bottoms in Antarctica valleys

Algal mats open a window on Precambrian ecosystems, while the rocks themselves provide clues in the search for extraterrestrial life

The day is going well. Researchers from Virginia Polytechnic Institute and State University have pierced the permanently frozen surface of Antarctica's Lake Hoare, using a large copper coil with hot anti-freeze coursing through its tubing to melt through the 18-foot-thick ice. Now the voice of biologist-diver Dale Andersen booms through a loud speaker; from the lake's floor in dark, frigid waters that verge on turning to ice, Andersen describes the rich carpet of blue-green algae he sees before him.

The scientists are here to see how the algae live just as they did 600 million years ago, without any higher life-forms. They also want to know how such plant life can exist under a permanently frozen lake surface, getting only a tiny fraction of the sunlight that passes through the ice, and even then for only part of the year. And other biologists are here to study lichens living inside the rocks, a recently discovered niche that suggests to some scientists that the Viking landers

VPI researcher secures diver's mitt, final step before hitting icy water to collect algal samples.

Illuminated by artificial light, the algal mat at bottom of Lake Fryxell brings the past to life.

Piercing Antarctica's layer of secrecy

Lake Vanda, in Wright Valley, is more than 200 feet deep and 77 degrees F at bottom; view is toward the sea.

on Mars may have looked for life in the wrong place.

Brilliant Austral-summer sunshine floods Taylor Valley, part of a small and rare ice-cap-free region called the Dry Valleys. Standing in the dazzling light, aquatic ecologist George M. Simmons jr.—bearded and clad in a black diving suit and red wool balaclava—holds up a sample of blue-green algae retrieved only minutes before and seeks to explain what lures him to this frozen oasis in the world's coldest desert.

Beneath him nature has created a living "window to the past, an analogue to an ancient ecosystem," he says. "Here you can look back in time 600 million years and see how an ecosystem functioned without higher life. This lake is almost a remnant of the past—almost like finding a dinosaur."

Blue-green algae—the name is a misnomer; they can assume all kinds of colors—straddle the evolutionary ladder between bacteria and green, or "higher," algae. Their cell structure resembles that of bacteria, but they possess that distinguishing capability of green plants—oxygen-producing photosynthesis.

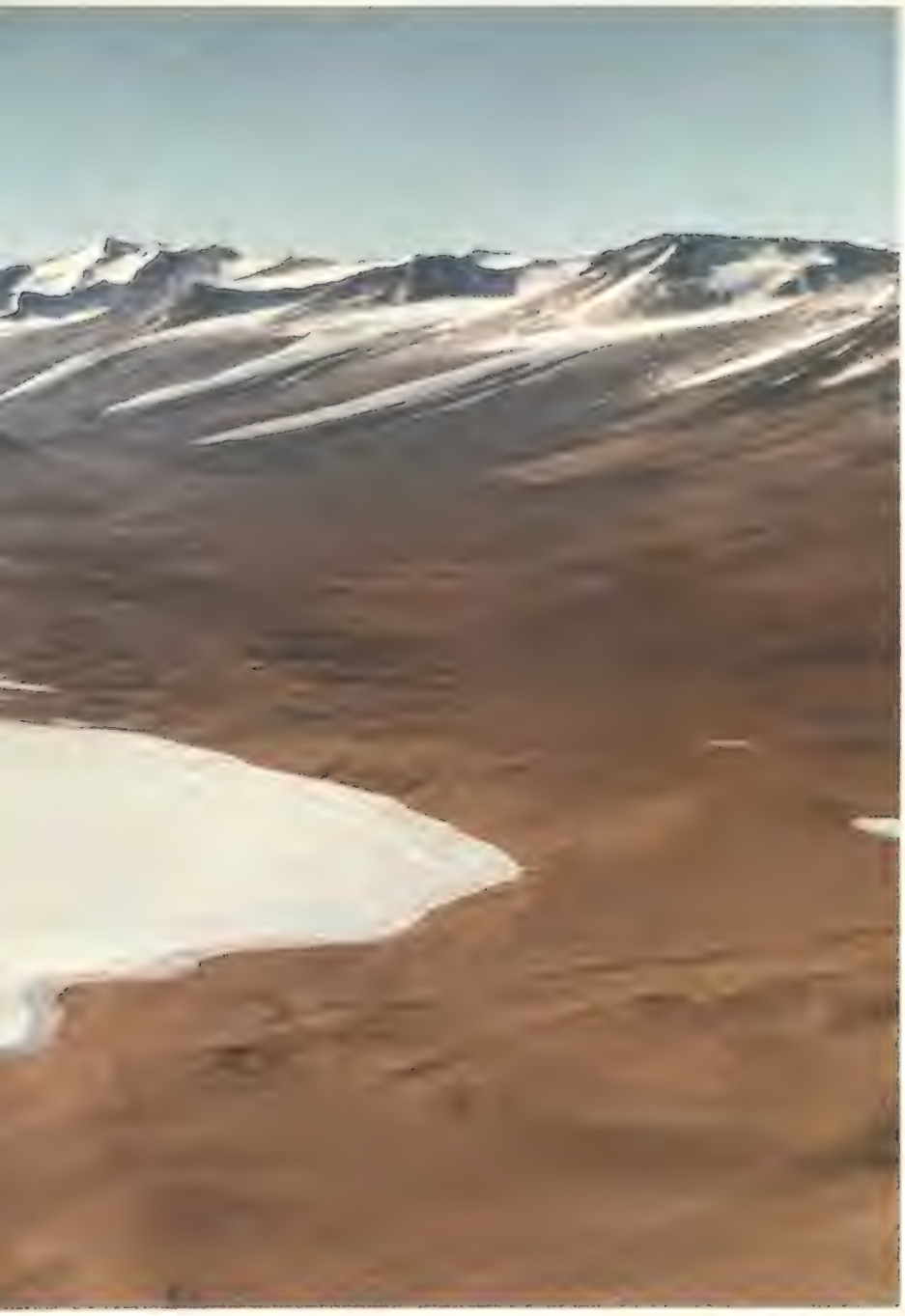
These organisms are among the oldest and most ubiquitous of Earth's life-forms. And they have changed little through their 3.5 billion years of existence. For nearly three billion years, they dominated the world's waters, thriving in dense mats like those that stretch from shore to shore along the bottom of Lake Hoare. But the appearance of higher organisms some 600 million years ago ended their reign, as such evolving creatures as worms, mollusks, crabs and shrimp broke apart the algae's thickly matted filaments and dominated the habitat.

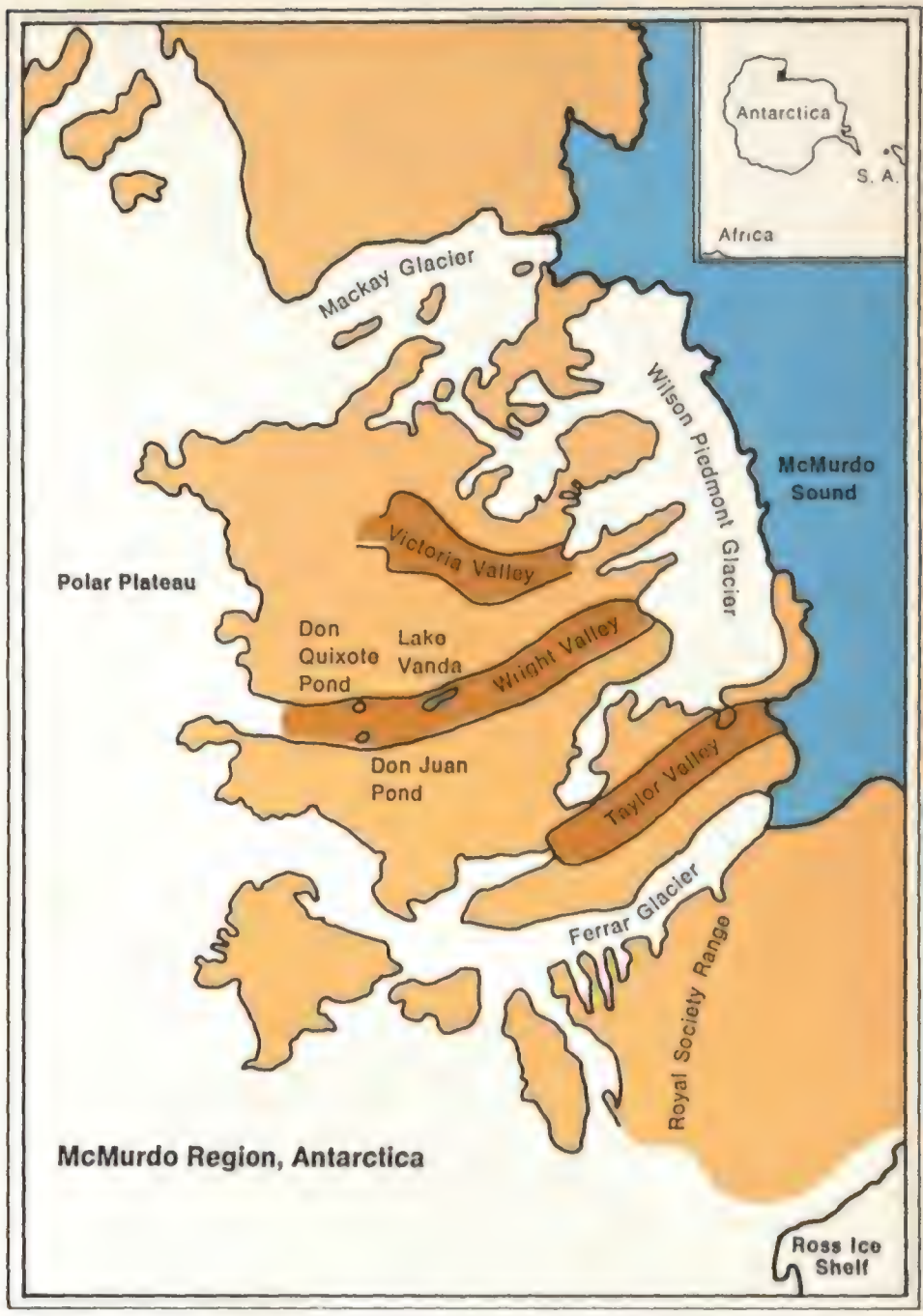
Thus the discovery three years ago by Simmons and his VPI colleague, botanist Bruce C. Parker, of an ancient life-form living its Precambrian life-style provided a unique biological laboratory, and raised some intriguing questions. How, for example, could these algae—plants that depend on sunlight for photosynthesis and life—survive and thrive in a place where no sun shines at least four months of the year?

That is what draws Simmons and others back each year to the Dry Valleys, their search for answers that can be sought nowhere else. The area is a treasure trove for scientists trying to fathom the geologic and glacial history of Earth's fifth largest continent and the tenacious ability of life to exist in extraordinarily harsh environments. The Dry Valleys may also explain the weathering processes of Mars, and the puzzling chemical composition of the Martian soil discovered by the Viking landers five years ago.

In a frozen land where the ice cover averages more than a mile in depth, where mountains have lain encased in blue ice for millions of years, the Dry Valleys are a rare sight, barren and brown. Here and there an

The author, who is national science and medical correspondent for the Newhouse Newspapers, wrote on National Institutes of Health in August 1979.





Dry Valleys (dark tan) lie within ice-free region (light tan) of Antarctica. Ice is white, water blue.

ice-covered lake lies amid their glacial moraines, and their flanks harbor an occasional alpine glacier inching down from the mountains above. Snowfall is meager; rain has never been recorded. An average air temperature for one of the valleys has been found to be close to 0 degree F, and at times hurricane-force winds suddenly sweep down from the high plateau of the East Antarctic Ice Sheet.

For years, the mountains rising above the valley floors were believed devoid of life. But life had found a foothold inside porous rocks. Unique lichens lived there, shielded from Antarctica's harshest elements and the eyes of the few scientists who passed by. These rock denizens, with their distinctive colored layering (p. 59), were finally discovered by microbiologist E. Imre Friedmann of Florida State University in 1976.

This region of mountains, high plateaus and valleys —principally Taylor, Wright and Victoria valleys— covers about a thousand square miles sandwiched between the western edge of the Ross Sea and the Transantarctic Mountains (above). It is only a helicopter hop from McMurdo Station, the main Antarctic base of the National Science Foundation, which now runs the U.S. Antarctic program.

"These valleys have turned out to be gold mines for understanding the continent's glacial history," says geologist George H. Denton of the University of Maine at Orono.

Twenty-five million years ago there were no Dry Valleys. The land lay buried under an expanding East Antarctic Ice Sheet that had overrun the Transantarctics. Heat rising from the Earth's crust and friction melted the underside of the ice. Over millions of years, the water beneath the glacier eroded weakened bedrock, creating valleys as later glaciers would carve the fjords of Norway.

By seven million years ago the ice sheet had retreated to its present size and mountain-building activity had thrust the Transantarctics higher, a combination that greatly reduced the flow of ice into the region. Winds blowing down from the ice sheet wore down the glacial remains, filling the valleys.

Piercing Antarctica's layer of secrecy

"The winds acted almost like blotters, soaking up the ice and snow," explains Denton. "The amount of ice lost exceeded the amount of ice that could pour through the valleys. So they became dry about four million years ago. If the ice sheet should become smaller or the mountains higher, then there would be other dry valleys created."

The lakes and ponds of the Dry Valleys are a perplexing lot with a diversity rarely matched in such a small area. "You would expect lakes in the same region to have more similarities than differences," Simmons says. "But that is not true in the Dry Valleys. Lakes lying side by side might as well be on the other side of the world with regard to their water chemistry."

Hoare is a freshwater lake with a temperature of 32 degrees F. Bonney, another Taylor Valley lake, is fresh at its surface and 12 times saltier on its bottom than seawater. The shallow Don Juan Pond in Wright Valley is so salty it never freezes, making it unique among Antarctic lakes. A few ponds are frozen from top to bottom.

In the Antarctic summer of 1977-78, Simmons and Parker began a survey to assess the water chemistry of ten lakes, and to study the limited life that existed within their waters. A year later, during their first scuba explorations of the lakes, the VPI team discovered the Precambrianlike growth of Lake Hoare's blue-green algae. Since then, Simmons and Parker have focused much of their work on the algae.

Blue-green algae are hardy plants, adept at growing in extreme and hostile environments. Their existence in the Dry Valley lakes has been known for years. Each summer, the edges of the lakes melt a few feet around the shore, leaving the permanent ice encircled briefly by a moat. Specimens of the algae had been collected from these waters. But it wasn't until the VPI researchers used equipment to melt through the lake ice

Martian landscape at Viking 2 site (above) shares similarities with Antarctica's Wright Valley (below).

Dry Valleys are believed to be the best terrestrial analogue for study of what may be occurring on Mars.

that algae were found growing all across the lake floor. With no higher creatures to disrupt their complex structures, the algae were thriving much as Precambrian algae had done throughout much of the world.

For a scientist, entering this watery realm is like passing through a time warp. "All of a sudden you get this feeling that you are down in a deep ocean looking at life as it was 600 million years ago," says Gordon Love, a VPI graduate student.

Lake Hoare's year-round ice is an extraordinarily effective sun block. Only about one percent of the light that strikes the ice surface penetrates to the water beneath. Algae growing at a depth of 82 feet must make do with only about one-tenth of one percent of the surface light. Yet somehow the algae harness that small amount of sunlight, using it as a source of energy to convert water and carbon dioxide into the organic compounds they need to live.

Plants living without sunlight

The discovery of the luxurious algal mats posed the question of how plants that rely on photosynthesis survive when the sun retreats below the horizon for one-third of the year. Simmons and Parker have studied the algae in the laboratory and offer this theory: during photosynthesis, the algae produce and excrete some short-chain carbon compounds, particularly one called glycollate. These compounds stay in the water and, when the sun disappears in winter, the algae use them as an energy source.

The system works this way: glycollate has to be produced, Simmons says. "And when we spike the algae growing in the laboratory with the compounds we expect to be produced, they take them up like a hungry man going through hamburgers."

This coming season, the VPI researchers will attempt to measure glycollate production over the period and conduct special experiments on what influences its formation and use.

The algae and other microorganisms in Lake Hoare do not live by normal photosynthesis and its by-products alone. VPI divers have found an anaerobic zone—a small basin within the lake where the waters contain no free oxygen. Hydrogen sulfide is released by bacteria, and possibly by the algal mats, living in the water and sediments of the lake floor.

Under anaerobic conditions photosynthetic bacteria, as well as blue-green algae, use hydrogen sulfide instead of water in their photosynthetic process and produce sulfur as a by-product instead of oxygen. This is the same process that the earliest photosynthetic microorganisms used before there was free oxygen in the environment.

Anaerobic photosynthesis is common in such places

Sandstone rocks at left, part of 6,500-foot high
Mt. Dido, harbor lichens just below the surface.

as the bottom water of lakes in warmer climes. But the process has not been studied well in the Antarctic. Now, Simmons says, the question is whether the algae lived in the basin before it turned anaerobic and somehow adapted to an oxygen-free life.

Last year the VPI team concentrated on four Dry Valley lakes: Hoare, Bonney, Vanda and Fryxell (pp. 52-53). Algal mats grow in all four. In Lake Bonney, the mats were found thriving in waters two to three times saltier than the oceans. At Lake Vanda, divers found mats at 100 feet and dredged more samples from as deep as 180 feet. They also found the algae in all four lakes are apparently forming stromatolites, a type of fossil. Comparing the Antarctic stromatolites with older fossils might reveal some of the environmental conditions that existed far back in time.

Simmons is unconcerned about how the algae found their way to the Dry Valleys; it is enough that they are there. "If someone told me these blue-green algae are the direct descendants of cells that used to live in swamps that existed when Antarctica was part of Gondwanaland, I could believe it," he says.

Imre Friedmann is no more certain how lichens appeared high above the valley floors, though he can now explain how they move from one rock to populate others.

Sandstone rock split open with geology pick reveals lichen, which appears as multicolored series of bands.

Shelter inside the rocks

Lichens—small plants formed by the symbiotic association of a fungus and an alga—have been known in parts of the continent since the turn of the century. But these were traditional lichens, attached to the surfaces of rocks and easily recognized, not incognito species disguising their structure.

The discovery of the rock-dwelling lichens was no accident, yet it held its own surprises. In the early 1960s, Friedmann was teaching at Hebrew University in Jerusalem. He and his microbiologist wife, Roseli, discovered the first example of life inside rocks. It was a blue-green alga that flourished within porous rock in the Negev Desert. The find proved to be the first of many.

"It turned out that wherever light-colored, porous rocks that also transmit light are present, there is a good likelihood there will be organisms under the crust," Friedmann says. "They are common in virtually all the desert areas of the world. We found them later in America, Africa and Australia."

During the 1960s and 1970s, scientists working on the experiments the Viking spacecraft would carry to Mars chose the Dry Valleys as the place on Earth most similar to the Martian surface, and therefore worthy of concentrated study. Friedmann, by then on the Florida State faculty, suspected that the coldest of Earth's deserts might also contain rocks harboring algae. In 1973, he asked Wolf Vishniac, a University of Rochester biologist bound for the Dry Valleys, to bring back some sandstone rocks for him.

Vishniac died in the Antarctic that year, killed in a fall. Later Friedmann received from his widow a bag filled with rocks Vishniac had collected before his death. Inside one, Friedmann found a blue-green alga very similar to the ones that inhabit the rocks of hot deserts.

Friedmann finally went to the Antarctic in 1976 under a National Science Foundation grant. One December morning a Navy helicopter landed him and a graduate student high in the Asgard Range separating Taylor and Wright valleys to search for rock-dwelling life. He still recalls that day with relish.

"We rushed to the first big boulder and cracked it with a geology pick," he says. "And there it was, the absolute first one we hit. In the hot deserts, it is always a brownish or greenish layer. And this was a three-colored layer—very unusual."

Friedmann's surprise came when he learned what accounts for the rock's odd coloration. The blue-green alga in the rock back in his laboratory was a rarity. Most of the life in the Dry Valley rocks consists of lichens. With the aid of several colleagues, including lichenologist Mason Hale of the Smithsonian Institution's Museum of Natural History, Friedmann has studied these rock flora extensively, on site and in the laboratory.

The organisms grow only under the north side of rocks—the side that gets direct sunlight and faces away from the bitter winds blowing down from the South Pole. In summer, air temperature may be only in the teens, but just under a rock's sunlit surface, temperatures can reach a cozy 50 degrees F. Sunlight, penetrating the porous sandstones as deep as half an inch, provides the energy that is needed for photosynthesis.

Piercing Antarctica's layer of secrecy

"In the Dry Valleys, the surfaces of rocks are so cold and inhospitable that no organism can survive on the outside," Friedmann says. "These lichens, instead of adapting to these inhospitable climate conditions, found a way to go underground, to go inside the rock where a better climate exists.

"They are living in very delicate balance. They have warm temperatures, light, and they get water from snow melt. The water is sucked in by the porous rock, which serves as a reservoir for the organisms inside. Most nutrients are present in the rock as minerals.

"But where do the organisms get nitrogen? We thought at first they must be nitrogen fixers, able to take nitrogen from the air. But they aren't. Rather, they get nitrogen from the snow. The snow has certain amounts of nitrates in it. There is just enough in the melting snow so that nitrogen is not a problem."

Classifying the Dry Valley lichens has proved difficult. For one thing, their structure is unusual. Rather than forming the normal, compact, coherent lichen body, the lichens' fungal filaments wind through the rock's tiny air spaces and twist around its mineral crystals. For another, they do not exhibit the normal sexual stages of lichens, on the basis of which lichens are recognized and classified.

The lichens living inside the rock are a new type. "Nothing like them exists in the world," Dr. Friedmann says. Yet, the chemical substances they produce are similar to those of other lichens. So far, Hale has identified five chemically different lichens living in the Dry Valley region.

In winter, the lichens simply shut down and await the warmth of another spring's sun. "One of their important adaptations is that they can stop and go easily, which other organisms can't do as fast," Friedmann says.

And at times some move on to new homes, uprooted perhaps by the chemicals they excrete in living.

"Some chemical activity, which we do not understand yet, causes the rock crust to flake off and the lichen is exposed," Friedmann explains. "Particles of the lichen are blown off by the wind. Once such a small piece gets into the proper place, it can invade and colonize a new rock. The remaining lichens grow deeper down when the crust falls off."

The existence of the Dry Valley lichens has buoyed the hopes of some that simple life might dwell hidden somewhere on Mars. The Viking landers found no evidence of life. But they did find terrain remarkably similar to parts of the Dry Valleys. Photographs returned by Viking 2 look as if they were taken along the flanks of Don Juan Pond (pp. 56-57).

Soil samples analyzed on the surface by Viking experiments puzzled scientists, for they suggested a land enriched with sulfur and chlorine. Exotic rock compositions were suggested to explain the findings. But the high-sulfur, high-chlorine content may be nothing more than a by-product of cold-climate weathering.

Geochemist Everett K. Gibson of the National Aeronautics and Space Administration's Johnson Space Center in Houston finds the concentrations of sulfur and water-soluble chlorides in the Dry Valley soils to be almost identical to the Martian concentrations measured by the Viking 1 and 2 landers.

"We see from our Dry Valley studies that soil enhancements can occur because of the weathering processes that occur in dry, cold deserts, and you don't need exotic rock compositions," Gibson says. "You can produce the concentrations seen by Viking by such things as daily freeze-thaw cycles, seasonal temperature variations, the very low moisture that is there, low relative humidities, and the wind velocities that allow the surface to be sculptured.

"By using the Dry Valleys to interpret Mars data, we can now begin to get a firm handle on the weathering processes that are at work on Mars. This will give us a real understanding of what we should look for the next time we go there."

It is for new understandings like these that scientists go south every year. "Antarctica is like an information bank," says George Simmons. "You go down there and work in the weirdest, wildest places and put knowledge in the bank; and later on you have questions about what happens elsewhere in the world—or even in other worlds. And you find that what you've learned there becomes worth its weight in gold."

VPI biologist-diver Dale Andersen watches as melter slowly penetrates 18-foot ice cover of Lake Hoare.

Laing Art Gallery, Newcastle-upon-Tyne

By Frank Getlein

Edwin Landseer's memorable animals pay American visit

A favorite painter of Victorian England, he was a child prodigy who captured the wilds of Scotland and gave his creatures soul

It is a law of human nature that whatever was most popular in any given generation shall be exposed as empty and ridiculous in the next and, sometime after that, be rehabilitated—at first in specialists' opinions and then in the general view. This law operates in politics as it does in fashion, but perhaps it may be seen most clearly in the visual arts, for the simple reason that a work of art tends—with certain exceptions—to stand still, to share basic assumptions implicit in most works of art created in the same time and place.

That law of the eternal return has lately repealed the oblivion once accorded to 19th-century American landscape painting and has been working for some years on the repeal of the same oblivion visited upon Victorian art. The latest manifestation is the triumphant return to the light of the Victorian painter par excellence, Sir Edwin Landseer, whose work is the subject of a large, carefully assembled and thoroughly researched exhibition just opened at the Philadelphia Museum of Art, where it will be on view through January 3, after which it travels to London's Tate Gallery.

As a candidate for rehabilitation after decades of neglect and denigration, Landseer has posed special problems. He was not only one of the most popular British artists of the Victorian epoch, his popularity spread by hundreds of low-priced engravings of his paintings and sealed, as it were, by his authorship of the bronze lions which decorate the base of the Nelson Column in Trafalgar Square; Landseer was also popular with Queen Victoria herself. He is linked with the set of social attitudes that have been retroactively mistrusted and even faintly despised by the liberated people of the post-Victorian years.

The question of Victoria is a little more complicated than that of a born prude improbably ascending the British throne and imposing her prudishness upon her nation. Her ascension was indeed improbable. She was the only child of the fourth son of George III; the odds on all three older sons shuffling off with no surviving issue were high, but so things did work out. Her father never made it to the throne, but when her uncle, William IV, cashed in, she was next in line (SMITHSONIAN, October 1981).

Victoria not only assumed the throne in 1837, she managed to transform the British monarchy from the

Her Majesty Queen Elizabeth II

Edwin Landseer started drawing at four, favored animals early on. Here, *Self-Portrait With Dogs.*

Wild Cattle of Chillingham reflects Landseer's affinity for animals of heroic proportions.

feared and mistrusted incubus it was at the time into a universally beloved institution, as British as shepherd's pie, you might say. The primness and propriety that characterized her reign helped very markedly in that long rehabilitation of the ailing monarchy, and was, in part, the result of the great influence exerted upon the young queen by her German cousin and husband, Prince Albert.

The Victorian style created by Albert and his bride naturally included literature and art, preeminently Tennyson and Landseer. Like the poems Tennyson wrote for an immense readership, and for his queen, the pictures Landseer painted for an audience scarcely smaller and less distinguished played an important role in forming the Victorian sensibility.

Like Victoria, Landseer was destined from birth for some measure of success in the line of work his family was in, although his destiny was revealed rather earlier than hers. Landseer was a child prodigy. His gifts were recognized early by his father, John Landseer, a popular and productive engraver and something of an eccentric. Landseer's first formal drawings were made from models set up by his mother when he was four. His father began his instruction in draftsmanship and there is an etching of cows in the Victoria and Albert Museum of a drawing made when he was eight. The father presently placed all three of his boys in class with Benjamin Haydon, thus launching the art school Haydon ran with some success. Like the father, Haydon instantly recognized Edwin's talent as superior to those of his two older brothers, Charles, a painter, and Thomas, like his father, an engraver.

The boy Edwin manifested his talent most clearly in his drawings of animals, mostly domestic and farm. But he also visited a private menagerie in London to sketch the monkeys and lions. He was already, before

A Midsummer Night's Dream gave Landseer a chance to try fairy painting, popular at the time.

National Gallery of Victoria, Melbourne

City Museums and Art Gallery, Birmingham

Landseer's visit to Scotland inspired *The Hunting of Chevy Chase,* based on a ballad about border wars.

he was fairly into his teens, gaining command of one of the most important areas in his work by studying anatomy and dissecting a lion. At 13, he won the silver medal of the Society of Arts for a drawing of a hunter and exhibited his first drawings at the Royal Academy. At 14, he was admitted to the Academy schools, one of the youngest students in his class, under the direction of Johann Fuseli, a painter fascinated with the weird and grotesque, who called Landseer, "my little dog boy."

At 19, he could boast of having sold more than a thousands pounds' worth of pictures. At 24, the statutory minimum age, he was elected Associate of the Royal Academy, becoming a full Academician before he was 30. He moved into his own house at No. 1, St. John's Wood Road, in his early twenties, and lived in it all his life, making periodic additions and gradually transforming it into a spacious villa. The house eventually had two studios, one of which opened to the garden so that animals could be ushered in. Among the elaborate furnishings of velvet and damask, the great animal painter hung heads—rams' heads, a wild boar's head and some 30 stags' heads with antlers. The inventory also listed tiger and bison skins, a stuffed swan and the skeleton of Hafed, Landseer's favorite deerhound. Animals, the live ones, roamed the walled garden, including dogs, deer, sheep, a chained eagle and supposedly a raven that had once belonged to Charles Dickens.

At about the same time as he acquired his house, the young painter made his first journey to the Scottish Highlands and discovered the second great passion of his art. Granting primacy to Sir Walter Scott and the final seal of approval to Victoria herself in her selection of Balmoral as a royal residence, it is nevertheless reasonable to claim that Landseer had a crucial part in making the Highlands the romantic land it became for Victorian England. Among the young

C. H. Pittaway, Esq.

A gillie tries to help in this sensitive and dramatic scene, *The Life's in the Old Dog Yet.*

painter's hosts on that first trip were Sir Walter himself at his home at Abbotsford on the River Tweed, and the Duke of Atholl, the latter infusing the artist with a taste for ducal company and ducal custom, both of which he enjoyed most of his life. (He may also have enjoyed the company of a duchess, Georgiana, Duchess of Bedford; he was widely rumored to be her lover and the father of at least one of her children, but nothing of this is certain and after the death of the duke she apparently refused his proposal of marriage.)

The Scottish interlude, which was to be repeated again and again, was responsible for several of Landseer's earliest efforts on a grander scale than he had previously essayed and, of course, ultimately for the whole Highland strain that is as celebrated in his work as it was in the minds of the Victorian book-reading and picture-viewing public. He was now in possession of the themes and sources that would occupy him for the rest of his career.

His first acquaintance with the royal family came in 1836, the year before Victoria's accession. Her mother, the Duchess of Kent, commissioned Landseer to make a painting of Victoria's dog, Dash, for a birthday present. Landseer was thus close to the center of the Victorian Age at its very beginning.

He was also well launched into the social ramble. He became quite friendly with both Victoria and Albert. They would sometimes drop in at his studio while riding in the park and he taught the young queen how to make etchings, correcting her drawings and bringing his own for her study. There were all those dukes and the occasional duchess, both in the country palaces and town mansions, both the most ancient and respectable and those of freer tastes. He was friendly with Dickens and Thackeray, continuing a sympathy for literary men that began in childhood with meeting Keats. He hobnobbed with actors, including Charles Kean and W. C. Macready, both towering figures on the London stage at the time.

He loved society, scandal, gossip and storytelling; his eyes twinkled when he told a good one. Once he was visiting the South Kensington Museum, or so he said, and was reprimanded by a guard for going too close to his own picture. "I am afraid I have touched it before," he admitted, whereupon the guard scolded angrily, "More shame to you. You might know better at your age."

Despite a busy schedule, he managed to keep up production, pleasing no end of customers among the aristocracy, the landed gentry and the recently rich of commerce and industry. Still, there were shadows across this brilliant career and enjoyable life.

The deepest shadow was caused by a nervous breakdown in 1840, at the height of his fame and his pleasure in life and, indeed, his art. He collapsed completely, gave up working and took one of the few foreign journeys of his life, traveling to Belgium, up

Private collection

In *Attachment*, canine love for man is clear as the terrier stands guard over his dead master.

the Rhine and on to Geneva, under the care of a devoted friend, Jacob Bell. This attack, at the time attributed by some to the death of his mother and by others to the widowed Duchess of Bedford's alleged refusal to marry him, proved to be but the first of a series of debilitating episodes. Throughout his life he was plagued with phobias, depression and other ailments. He took drugs and drank, and spent his last few years in the grip of a profound melancholia.

Perhaps related to these attacks, or coming from a common cause, Landseer, in spite of his fair prospects, brilliant successes and universal esteem, picked quarrels with his friends, alienated his best clients, including Queen Victoria, and found dealing with the business of daily life close to impossible. The queen complained that he would not finish pictures on time, or even ever; that he would not turn up at Windsor Castle on command; that he could not be bullied into submitting proper bills for his work, which was extensive, involving wall decorations as well as numerous pictures commissioned for and by the royal family.

Landseer refused the proffered presidency of the Royal Academy, perhaps out of fear of his illness. He was the most popular English painter of his generation and helped younger painters, most notably J. E. Millais. He supported and provided for his extended family, although he himself never married. He attracted some favorable notice from European as well as English critics. Yet among his preoccupations when sunk in melancholia, in addition to the vision of his own funeral, was the fear that his reputation would vanish, that he would be at first devalued, then forgotten.

The fall of a reputation

In this Landseer proved to be remarkably prophetic, the more so since at the time of his death, in 1873, he could hardly have foreseen the rise of Impressionism, just then about to have its first organized show in Paris, and the endless flow of modern art which swept away the dominance of academic painting in Europe and in England. With the latter, hardly noticed in the flood, went the towering reputation of Sir Edwin Landseer.

Until the new exhibition at Philadelphia, the general impression of Landseer among art people was discreetly expressed by British art authority Sir John Rothenstein: "Landseer's appeal perhaps escapes us now [1965]. . . . His subjects, sense of design and handling of paint all seem rather facile."

More recently, the scarcely less authoritative *Oxford Companion to Art* added a moral judgment to Rothenstein's diffident discretion: "He pandered to popularity and squandered a fine gift."

Nor did such adverse judgments await the transformation of painting in our century which inevitably has affected the vision of Sir John and the companionate Oxonians. In 1894, a mere 21 years after Landseer's death, a professor of art history at Rutgers, John C. Van Dyke, wrote of Landseer: "More 'smart' than powerful . . . too much sentiment." Van Dyke, like others since, compared Landseer unfavorably to Antoine Louis Barye, the French animal sculptor, and some of those others have cited Rosa Bonheur as an animal painter superior to the Englishman.

Ruskin, to be sure, called *The Old Shepherd's Chief Mourner*, among Landseer's most popular pictures, "one of the most perfect poems," which Rothenstein cites with an air of disapproval if not disbelief. Almost since then, any critic remotely approaching Ruskin's status would automatically dismiss Landseer along the lines quoted.

In the face of such opinion, it obviously took some courage for the Philadelphia Museum to put on an

Her Majesty Queen Elizabeth II

Queen Victoria joins husband Albert and child
in this 1842 scene, *Windsor Castle in Modern Times.*

elaborate exhibition of Landseer's work, complete with a catalog full of good illustrations in color and black and white; a detailed, analytical biography by Richard Ormond; a provocative and illuminating essay by Joseph Rishel entitled "Landseer and the Continent"; and an extraordinarily informative formal catalog of the pictures in the exhibition. All of the resources of modern art history scholarship have been brought to bear on a Victorian painter hazily recollected and by and large agreed upon as worthy of that haziness.

The exhibition at Philadelphia lifts the haze, and when it does so the visitor is surprised, intrigued and finally delighted by what becomes visible.

The author wrote on the North Carolina School of the Arts for the March issue of SMITHSONIAN; *his book on* The Impressionists *was published recently.*

What becomes visible is primarily that Landseer was indeed a formidable painter in all but the very highest meanings of the term. He had great native talent, he was well schooled and he performed masterfully just about every time. Secondarily, what one notices, with a certain amount of chagrin, is that the obloquy Landseer's posthumous reputation has endured was based on an early-20th-century Puritanism in art held by some influential critics. This belief purported that only in the 20th century had art reached its finest fulfillment; that while virtue might be perceived in artists of the past, such as Cézanne and Michelangelo, who somehow might be thought to relate to or foreshadow the 20th century's achievements, no virtue whatever could be admitted to artists of the past who did not so relate or foreshadow. Landseer belonged to the latter category and was dismissed.

We can see him more clearly today, thanks to Phila-

The Earl of Malmesbury

This charming and luxurious portrait is of the artist's friend, *The Viscountess FitzHarris.*

delphia, chiefly because the evangelical spirit seems to have passed out of modern art. Late-20th-century American painting seems to have settled into a modern democratic eclectic agnosticism wherein the principle *cuius regio, illius religio* seems to govern, every man being his own *regio* and entitled to choose his own religion.

Consider that early ambitious figure composition, *The Hunting of Chevy Chase* (p. 65), which anytime from 20 to 70 years ago would have been, undoubtedly was, dismissed as "a great machine." Based on one of the best known border ballads, the painting depicts a challenge to Scottish exclusive hunting rights by a neighboring English lord, Percy, the Earl of Northumberland. The Scottish leader, Douglas, and a band of armed men, meet him. They battle and both earls and many of their followers are killed.

Although Landseer was indeed familiar with the story, he chose to paint not the battle but the preceding hunt. Percy reins back his horse to strike the death blow to a stag already downed. The lead archer looks back for indications of instruction. Another hunter winds his horn with an expression directly descended from Renaissance Italian images of Triton winding his conch shell in the waves. The evocation is fair enough because the composition is wavelike in the rising crest of the earl and his horse, the complementary movements of the hounds and the deer. It is a tight, dynamic, wound-up composition, with wonderful handling of the variety of furry coats of the animals, the armor and fabrics of the men, the disposition of all the figures as well as the evocation of the sporting, chivalric and untamed world of Scotland.

What about sentimentality, a grievous fault that Landseer's posthumous reputation has answered by its own all but total obliteration? When it was

painted, the picture certainly had sentimental appeal to many in the sense of pointing to values outside the painting, the historical romance of Sir Walter Scott, the general symbolism of Scotland as harboring a wilder, freer, more in-touch-with-nature sort of life than London did.

Today, it seems reasonable to assume, few are familiar with the border ballads. If we are told the story, we know more about the picture, but the picture stands or falls on its own virtues, not on the associations the Victorians endowed it with. The answer is clear: it stands, its virtues are formidable. Romantic? Yes, in terms of history revived. Sentimental? Not a drop survives and yet the picture lives and lures us into a frozen moment of high action long ago.

One of the specific charges made and repeated about Landseer was that his deer were too noble. His supreme expression of that quality, surely, is *The Monarch of the Glen* (right), originally part of a decorative scheme for the refreshment room of the House of Lords. Later, as is the way of deliberative bodies when it comes to art work, the Lords failed to fund the scheme. It was finished as an easel painting and sold. The *Monarch* is noble, a full 12-point royal stag, alert in vision, hearing and smell to the approach of blood-sport lairds or hungry poachers, that alertness enhancing, a little ironically, the nobility. The awful truth is, of course, that such an animal is indeed "noble" in the eyes of most humans, as are the lion and the eagle and as the weasel and the mole are not. Here is a noble subject nobly portrayed, with a marvelous range of colors within a strictly limited palette. Incidentally, the high rocks on the left are to this day known locally as "Landseer's Rocks."

Obviously, if any painting deserves the adjective "Victorian," it is a picture of Victoria herself. Landseer painted the queen and her prince, their children, their dogs, their birds, their recreations. His first picture to establish his royal connection was of Dash, the favorite dog of the then Princess Victoria. A few years —and a coronation, marriage and childbirth—later, he did *Windsor Castle in Modern Times* (p. 68), a family group with Victoria welcoming Prince Albert back from the hunt, his dead prey laid decorously—and improbably—on a drawing-room stool, the dead birds regarded by the diminutive Princess Royal.

The whole is an improbable yet convincing assemblage of royal symbolism carefully and expertly disguised as a family moment, a "conversation" as such pictures were called. Regality of the queen is evident in her erect stature, and in the fact that it is she who is standing and dominant. Prince Albert, clearly, is in a costume stating "outdoors, masculine, healthy, killing birds, liking dogs," while the tiny Princess Royal is being initiated into the blood-sport traditions, even rituals, of royalty.

Rife with symbolism, the picture is not sentimental in the least. This is also true of what was probably one of Landseer's most widely known and loved pictures, *The Old Shepherd's Chief Mourner*. Once more the terrible truth is that, whether Victorian sensibility did or did not attribute human feelings to animals (it did), dogs do seem to "mourn" for dead humans they have lived with for years. And the picture itself, showing the dog's head resting on the casket, is painted with great restraint and the least possible concession to that anthropomorphizing sensibility.

There are occasional lapses, generally small animal pictures in which the animals really are given human characteristics, sometimes human clothes. This is an old tradition in art and almost automatically lessens the stature of a painting or sculpture employing it, at least in our eyes.

One final word on that sentimentality that has caused half a century of critics, curators and customers to underestimate Landseer: if sentimentality in art can be provisionally defined as the reliance on values outside the work of art for its effect, certainly there has never been so sentimental a school of art as American Abstract Expressionism. By Harold Rosenberg and by the painters themselves, the achievements were defined in terms of the "daring" or the "risk-taking" of the artist, of this "performance" in the "arena" of the painting. But, in fact, the viewer in gallery or museum never saw any of those values: they preexisted the painting, or at least so we must believe. They certainly do not appear in the paintings them-

In *Monarch of the Glen*, a royal stag embodies the untamed glory of Highlands that Landseer loved.

selves. There are splendid pictorial values in many of those works, especially in those of Hans Hofmann and Willem de Kooning, but the heroism and the sanctity we are really asked to admire are not visible, are taken strictly on faith. Consider, particularly the seemingly endless series by Robert Motherwell, *Elegies to the Spanish Republic*. There is nothing either elegiac or Spanish republican about any one of those paintings: quite formally, they demand reference to two things totally absent from the works as seen. They demand, in short, sentimentality.

The point is merely and modestly that sentimentality in art was neither something the Victorians invented nor something that died with Victorians. It is a constant, recurring in whatever kind of art people are painting at any time. When the moment passes, the sentimental passes. If the sentimental was all that was there or the principal value there, what remains will be valueless. If the sentimental merely adhered to, or strengthened, or seemed to strengthen, the inherent values, those values will remain, as unencumbered by the sentimentality of an age gone as by that of a new age arrived.

That is the achievement of the Landseer exhibition in Philadelphia. A painter probably overrated in his time and place and certainly underrated ever since has been restored to visibility and to our vision. It is much to be grateful for.

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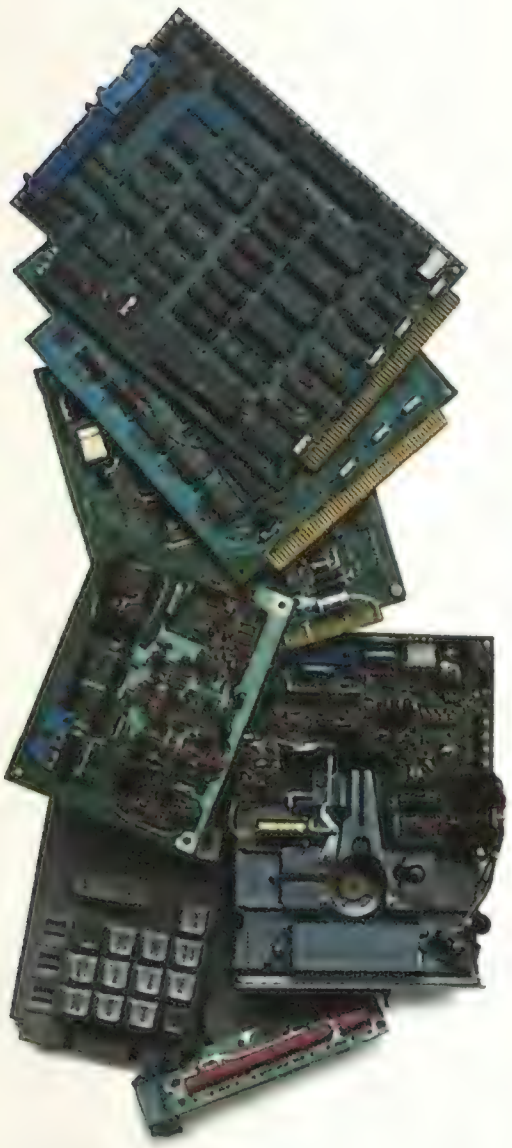

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Courtesy Château de Valencay

Steely eyed portrait of the master of intrigue, by Pierre Prud'hon, hangs in the château today.

By Robert Wernick

M. de Talleyrand, a controversial prince of politics

This wise and shifty statesman, with an eye for pretty women and high finance, lived the grand life, no matter who ruled

The Marquise de La Tour du Pin-Gouvernet, a lovely young refugee from the Reign of Terror, was living a life of republican frugality with her husband on a farm in Troy, New York. One day in the fall of 1794 she was out in the yard, boning a leg of mutton, when a familiar deep voice boomed out in French behind her. She turned to see one of her oldest friends come hobbling out of the primeval forest, his hair powdered with an air of Parisian elegance. He was Charles Maurice de Talleyrand-Périgord, and when she had known him in the light-drenched days before the fall of the Bastille he had been a bishop of the Roman Catholic Church and one of the most dissolute young men about town—always gambling or climbing into some duchess' or opera singer's bed when he was not conspiring to subvert the monarchy of Louis XVI. He had later been one of the leaders of the Revolution and had written a good part of its most famous charter, the Declaration of the Rights of Man. Just now, he too was in flight from the Terror.

The marquise noted in her memoirs that M. de Talleyrand was shocked to the core to learn that his friend Alexander Hamilton was thinking of resigning as secretary of the treasury so that he could make more money. A secretary of the *treasury* short of cash? In Talleyrand's terms, it was unthinkable.

He soon enough had a chance to show how things should be done. Robespierre had been guillotined and the radical days of the Revolution were over. By late 1796, Talleyrand was back in Paris, and one of his ex-mistresses, Germaine de Staël, bullied her friend Paul Barras, who was running the government at the time, into appointing him minister of foreign affairs. He quickly notified the ambassadors and agents of foreign powers who were swarming all over Paris that he did not expect his salary to take care of his old age. Within two years he had millions of francs salted away in banks abroad. If the foreign representatives wanted to get business done with the French government, it was necessary to see to it that Citizen Talleyrand could go on living in style.

One way to glimpse that style is to visit his home, the Château de Valençay in the Loire country, 225 kilometers south of Paris. The château remained in the prince's family till a few years ago, when the Talleyrand-Périgord name became extinct. Since then the castle and the magnificent country around it have come into the possession of an association formed by local authorities and local banks. One of the banks, the Crédit Agricole, has provided the considerable funds needed for repairing, restoring and refurbishing the house and grounds, and the whole of the house of Talleyrand-Périgord, with its 180 rooms, is open to the public.

It is not quite as its famous owner left it. His 15,000-volume library and his collection of Rembrandts, Holbeins and Riberas are no longer there. But much remains, and much has been replaced. Visitors today can see the state dining room where everyone who counted for anything in Europe longed desperately to be invited, to eat one of the meals pre-

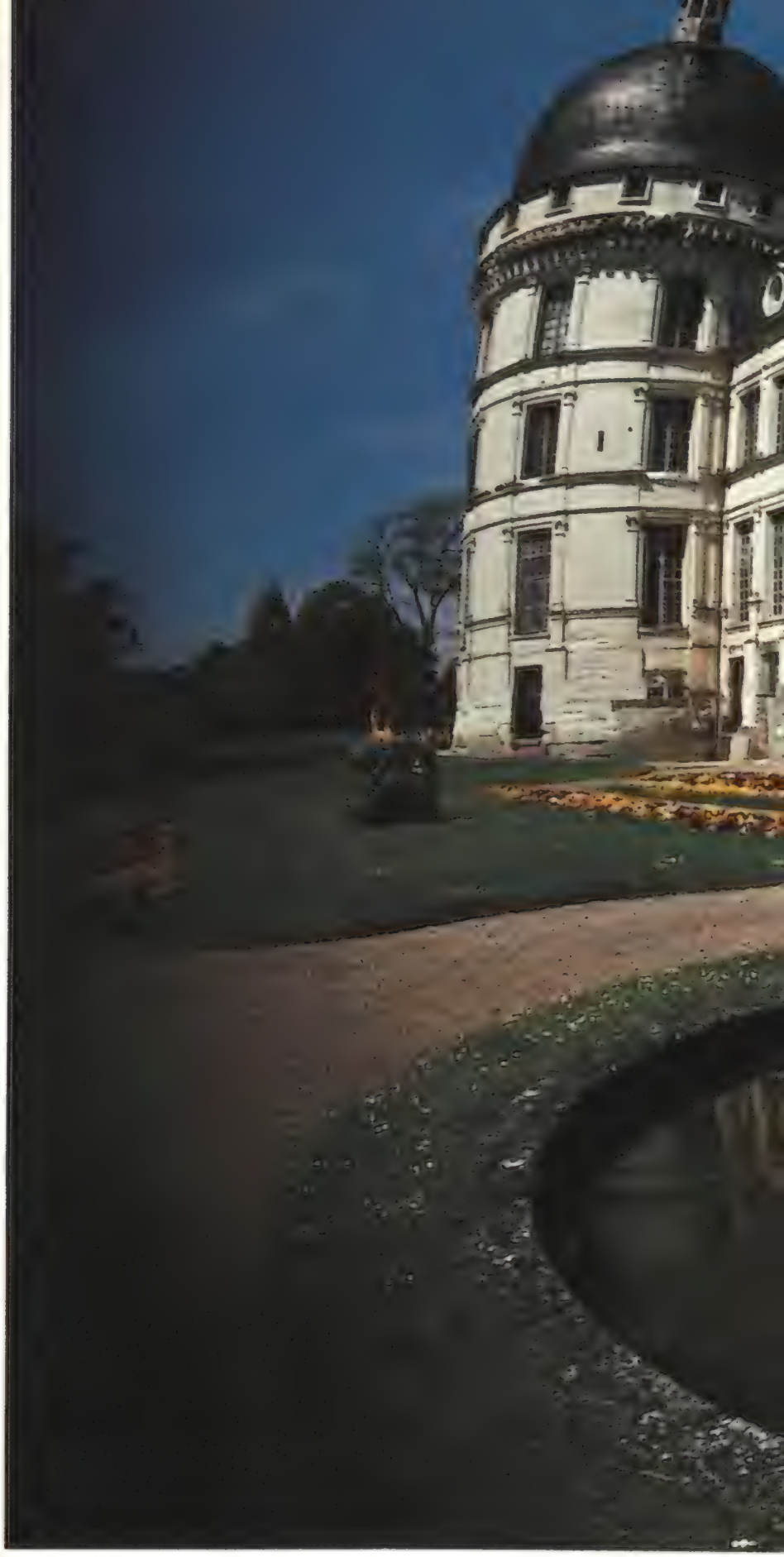
Robert Wernick lives in Paris and Georgia, writes frequently for SMITHSONIAN. *His last article, on the Ringling Museum, appeared in September.*

Photographs by Pierre Boulat

In the drawing room of Château de Valençay is a table used by Talleyrand during Congress of Vienna.

A display of some of the glittering medals that adorned Talleyrand's court dress and uniforms.

Mahogany desk, once owned by the King of Naples, has secret drawers and concealed racks for rifles.



Viewed from the garden is the 180-room residence where Talleyrand regaled the notables of Europe.

pared by Carême, perhaps the greatest chef of the century. Talleyrand set standards in eating. He loved cheese, for example, and decreed that this dish, often considered rather plebeian, should be served as a separate course before the dessert. His estate produced a particularly succulent form of goat cheese known as pyramide de Valençay. These cheeses were actually made in the form of pyramids, but the prince with his customary tact did not want to remind Napoleon, every time he sat down to dinner, of his unfortunate

expedition to Egypt, so he had their tops cut off, giving them the truncated shape they bear to this day.

There is the secret staircase connecting the bedroom of the prince with that of his niece, the Duchess of Dino, not that there was anything secret about their liaison. On view also is the little anteroom where, the story goes, Talleyrand sat for an hour or so in the morning talking gossip or affairs of state with his distinguished guests while he bathed his deformed foot—a hard round knob of flesh with five nails sticking out like claws, said the autopsy—in water brought specially from the mountain village of Barèges.

Displayed is the very table (p. 75), brought from the Kaunitz Palace in Vienna, at which he sat while he entertained, cajoled, dazzled and hoodwinked the crowned heads and foreign ministers of Europe at the Congress of 1814, which brought peace after the Napoleonic chaos.

Here is the magnificent desk (left) offered to the prince by Joachim Murat, King of Naples and Napo-

Flamboyant peacock graces garden of château where visitors can glimpse a slice of princely life.

leon's brother-in-law, a real conspirator's companion with its half-dozen secret drawers and its two concealed racks for rifles.

There are portraits without number, of the prince himself in various costumes under various reigns, and of his family: his cynical uncle the archbishop and his foppish father the colonel; his narrow-minded mother who regarded him as a monster, though he remained devoted to her and protected her life and her property through all the calamities of the time; his sweet great-grandmother, the Princess of Chalais, who took care of him from the ages of four to six, and was the only kind and unselfish person he was to know in all his life.

Valençay was not a family inheritance. Talleyrand bought it in 1803 for a price that was beyond his own resources, even considering that he may have just wangled a ten-percent commission on the Louisiana Purchase which he had helped negotiate. But as always he had a friend when he needed one. By this time, having been a principal figure in the conspiracy that brought Napoleon Bonaparte to power, he was foreign minister for the new ruler, who was willing to advance him a few million *livres* for his new estate.

The estate was immense. It stretched over 19,000 hectares of plowland and pasture and game-stocked forest, including 25 towns and villages, all the personal property of the master of Valençay. In the middle was a park of 150 hectares dotted with ornamental trees and statuary; and in the midst of that, with splendid views of the whole, was the château itself, massive and elegant, hundreds of years in the building. It was so vast, with its 25 master apartments, its great gallery 70 meters long, that it took Talleyrand and his wife three days just to walk through the place.

Honeyed phrases and aristocratic manners

Napoleon expected to get full value out of his investment in Valençay. Talleyrand was a man of whom he was slightly in awe. He admired him for his intelligence, his lucidity, his total unscrupulousness, his skill at finding honeyed phrases to justify any crime or aggression. He admired him most of all for his aristocratic manners. He was at ease in any situation and knew how to put others at ease if he wanted to. He knew when to talk and when to be silent, and how to keep at all times a cool look on his smooth, handsome, somewhat feline face. This was the kind of man Napoleon wanted to add some class and teach some manners to the rough soldiers and boorish adventurers who formed his court.

He made Talleyrand Prince of Benevento, a small south-Italian state he had filched from the Pope. But Talleyrand never needed a title. His was an old and

proud family of France. *Réqué Diou* was their motto, roughly meaning, in the Périgord dialect, nothing above us but God. Talleyrand in his lifetime was bishop, prince, duke, foreign minister, prime minister, ambassador, grand chamberlain, vice-grand elector and mayor. But to be called simply Monsieur de Talleyrand was enough for him. (Only it was not pronounced Talleyrand, it was something more like Tie-a-rond.)

One of his duties as Napoleon's foreign minister was to give dinners for 30 or 40 guests, prepared by the best chef in Europe, at his Paris home, which is now the Hôtel Matignon, official residence of the French prime minister. At Valençay he was to do the same, on a still grander scale. Every fall he would receive foreign dignitaries and ambassadors and offer them superb food, hunting, conversation, gambling and other delights. I want your guests, said Napoleon, "to feel that an invitation is a reward to the representatives of sovereigns with whom I am pleased."

Although Talleyrand cultivated a lackadaisical air, he appreciated modern efficiency, and recognized a valuable piece of real estate when he saw one. At Valençay he promoted a cotton-spinning machine and Merino sheep and new crops, and soon he was adding a substantial amount of income from the property to what he was also getting in under-the-table money from foreign diplomats. Then in 1808 Napoleon, who had given, decided to take away.

The Spanish princes come to stay

It was the year 1808 in which, as Talleyrand saw it, Napoleon went mad. Instead of a just and profitable peace, which was what his foreign minister wanted, he wanted domination of the world. He determined on an act of pure folly, the gobbling up of Spain. As a preliminary, he invited the princes of the Spanish royal family to Bayonne and after receiving them royally he kidnapped them. He put his brother on the Spanish throne and turned the captives over to Talleyrand, with orders to keep them quiet and comfortable in his château of Valençay.

Talleyrand was always quiet and courteous and efficient. The princes expressed their heartfelt thanks for the many services he rendered them during their six-year stay. The Spanish flag flew over the château roof, and Spanish guitarists played boleros in the trees of the park at dusk. The princes had everything they wanted, from prayer books to lady friends, delivered to their door.

Talleyrand didn't much care for the expense of looking after his royal guests. That was galling enough, but even more so was the ignominy of being forced into the role of jailer. This may have been the

Window life at the château: above, Houdon's *Diane Chasseresse*; below, employee arranges flowers.

Mme. de Talleyrand, some ten years before marriage at 39. Napoleon said: Marry her or give her up.

final stroke which turned Talleyrand from faithful servant to deadly foe of the emperor. At all events, it was in 1808 that he began a treasonable correspondence with the czar of Russia, setting in motion a fatal machine that was to rumble on to Waterloo and Napoleon's downfall.

Once again Talleyrand was about to jump the political fence, as he did when he supported first the Revolution in 1789 against King Louis XVI, and then Napoleon as he supplanted the revolutionary government ten years later. Explaining these and the reversals that characterized his life, Talleyrand wrote: "I came to the conclusion that I must serve France as France, whatever the situation happened to be."

It was many years before Talleyrand would reside at Valençay again. He went on living his gay and very dangerous life, always powdered and perfumed, playing whist till all hours with his mistresses, gambling, making famous witticisms ("Madame de Staël is a very gifted writer. She has succeeded in representing the two of us, herself and me, in the guise of women") and working tirelessly for the fall of the tyrant who was ruining France and Europe. His expression never changed. Once Napoleon, suspecting him of treason, shouted at him during a council meeting, "You are *merde* in a silk stocking," and stormed out of the room. "What a pity," said Talleyrand, "that so great a man should be so ill-mannered." Everyone expected him to be hanged the next day, but Napoleon never got around to giving the order, an act he regretted later on.

By 1816, when he could at length return to Valençay, the world had turned topsy-turvy again. The Spanish princes had left to rule over their unhappy land. Napoleon was out and a Bourbon king was back on the throne of France, called there by a provisional government headed by Talleyrand. And France itself, thanks largely to Talleyrand's brilliant diplomatic maneuvers, had got out of its disastrous wars with its boundaries and prestige largely intact.

The world was changed, but not Valençay. Still powdered and perfumed, the statesman—an elder statesman now—received his guests in the old courtly style, walked limping at their sides and offered them exquisite food and hunting and gambling and conversation laced at times with venom ("When no one is talking about him, M. de Châteaubriand thinks he has gone deaf").

Of the scores of women in his life, three appear on the walls of Valençay (above). There is his wife, the beautiful featherbrained *bel animal de salon,* Catherine Grand. She, according to one of many versions, appeared on his doorstep one night with a tale of being chased by the police and was kept on at his home for years until Napoleon made him marry her in the name of propriety. When she grew fat and dowdy, he was pleased to see her attach herself to the Duke of San Carlos, the equerry to the Spanish princes at Valençay.

The two other women came into his life in the climactic year 1808. He was looking for a suitable match for his nephew Edmond, and he heard that the

The Duchess of Courland, a distant relative by marriage, and one of the loves of his life.

Dorothée, Duchess of Courland's daughter, wife of Talleyrand's nephew and another great love.

Duchess of Courland, a Russian subject of lofty character and immense wealth, had one unmarried daughter aged 15 living on one of her vast estates in Eastern Europe. The girl, Dorothée, was dark and thin and willful and romantic, madly in love with an aging Polish patriot. They convinced her that the Pole had married another and practically dragged her to the altar. Edmond was a military booby and she had little to do with him for the rest of her life.

Her new uncle was another matter. He had formed a liaison with her mother, the duchess; he loved her dearly for many years and employed her as a go-between in his secret dealings with the czar. Gradually he transferred his affections to the daughter. How he kept them happy under one roof (with his wife along occasionally as well) is a secret that died with 18th-century diplomacy.

Dorothée betrayed him with younger men (there was, after all, a disparity of some 40 years in their ages), but she was devoted to him, made an admirable mistress of his household, helped run his affairs, and—although never acknowledged formally—gave him a lovely daughter Pauline who was the delight and consolation of his old age.

He didn't spend all his declining years in the country. He was in Paris much of the year, fishing as usual in troubled political waters. The Bourbons were never sufficiently grateful to him for having brought them back; they could never quite forget his revolutionary and Bonapartist past. He sensed that the Bourbons were losing their grip on the nation and went back to his old game, conspiring for their overthrow. He found time to help along the careers of various young men he found promising. Among them was a rising and extraordinarily talented painter whom, according to all the evidence, Talleyrand had fathered a quarter of a century before with the wife of the man who preceded him as foreign minister. The painter's name was Eugène Delacroix.

When the revolution of July 1830 broke out, Talleyrand was playing his familiar role as host. Suddenly the church bells of Paris began to ring. "We triumph," announced the prince happily. "Who are we?" asked one of the guests. "I will tell you tomorrow," said the prince and went on with his pleasures.

It was his little joke. He knew perfectly well who had won. It was the Duke of Orleans, "citizen-king" and son of the man who had helped engineer the Revolution in 1789. Talleyrand approved of the emergence of this mild constitutional monarchy and

An exotic note, of the kind the prince would have loved, is added to château grounds by a dromedary.

the triumph of the bourgeoisie over the aristocracy. Again the government had changed, yet Talleyrand remained in favor. At this last count, he had played roles in five very different acts of French political history—the Bourbon rule of Louis XVI, the Revolution, Napoleon, the restoration of King Louis XVIII, and now the Duke of Orleans. There were to be more shifts as France fumbled toward a permanent system of government, although the great statesman would soon be out of the picture.

For the rest of his life, Talleyrand went on serving his new master, and as ambassador to England from 1830-1834, he used his great arts for the last time to avert a general European war.

He preserved his dignity and his deviousness to the end. When he was dying, at the age of 84, lying in excruciating pain, moved around by ropes and pulleys on his silk sheets to keep the open sore on his back from rubbing against the bed, he determined that it was time to make his peace with the Roman Catholic Church. The terms of his repentance and readmission to the fold were minutely and painfully negotiated with Rome. When the documents were all ready, he kept putting off signing them. He felt it would be undignified to go on living as merely a repentant old sinner. He waited till he was sure his last agonies had begun and then announced that he would sign between five and six A.M. on May 17, 1838. And gritting his always well-polished teeth against the pain, he held on until the last possible minute, then signed in front of five witnesses, received the last rites of the Church, and peacefully expired.

He was well bred to the last. To the surgeon poking around with scalpel in the gaping hole in his back, he said only: "Do you know, sir, that you are hurting me terribly?"

But then he was an expert at suffering. In all the grandeur of Valençay there are only a couple of reminders that the Prince of Benevento, Bishop of Autun, vice-grand elector and all that, was a cripple, who found it painful all his life to walk or even to stand, as he often had to do for hours on end at court ceremonials. The great marble staircase at the château was rebuilt at his command; the steps are extra broad and extra short, to enable him to sidle his way up and down. And in a glass case downstairs there is preserved one of his shoes, or rather one of the contraptions he had to wear on his right foot, a clumsy pail-like boot with an upright steel bar attached: pitiful to look at as it was uncomfortable to wear.

Talleyrand knew well why he was lame. His mother had taken an antipathy to him the day he was born. Babies were not treasured objects to be kept around the house in those days when you had a busy life of gossip and attendance at court, but his parents pushed neglect to an extreme. While his brothers were at least allowed to grow up out of sight around the home, Charles Maurice was put out to nurse with a poor woman in the suburbs of Paris and his mother did not even look at him till he was about four years old. In the meanwhile, the baby had fallen off a chest of drawers and crushed one of his feet, and the nurse never thought of calling a doctor to look at it. The broken bones coalesced into a round, hard mass, a clubfoot. (This was Talleyrand's version, but according to François Bonneaux, curator at Valençay, later research has indicated that Talleyrand was born with the deformed foot.)

Whatever the cause, his family was displeased with his infirmity, which disqualified him for a commission in the army. He was therefore sent to a seminary to be made into a priest. Raised without love at the very center of power and privilege, he learned very early how to look on everything around him with the same cold, bright, merciless eye. This was the sphinxlike stare that fascinated his contemporaries, the same stare he would turn, if he came back to Valençay today, on us tourists filing by his belongings, or if he looked out the window to see his stare returned by a camel or one of the many other animals roaming the château grounds. He would be calculating quickly what these phenomena could teach him about the current state of French society, and how much money he might hope to make off that camel.

Talleyrand's boot for his deformed foot and stick, of narwhal tusk with gold pommel, are on display.

Robert and Mathilde, fresh from riding in a Peugeot 505S for 3,000 miles on one of the most horrendous roads in the world.

It is late afternoon. The rain has turned to a cold drizzle. In the gloom, a mud-spattered car pulls off the road and stops in front of a small, nondescript building.

Men in blue lab coats hurry over to the car and open the doors. The driver's seat is empty. There are no human beings in the car.

Orders from under the road

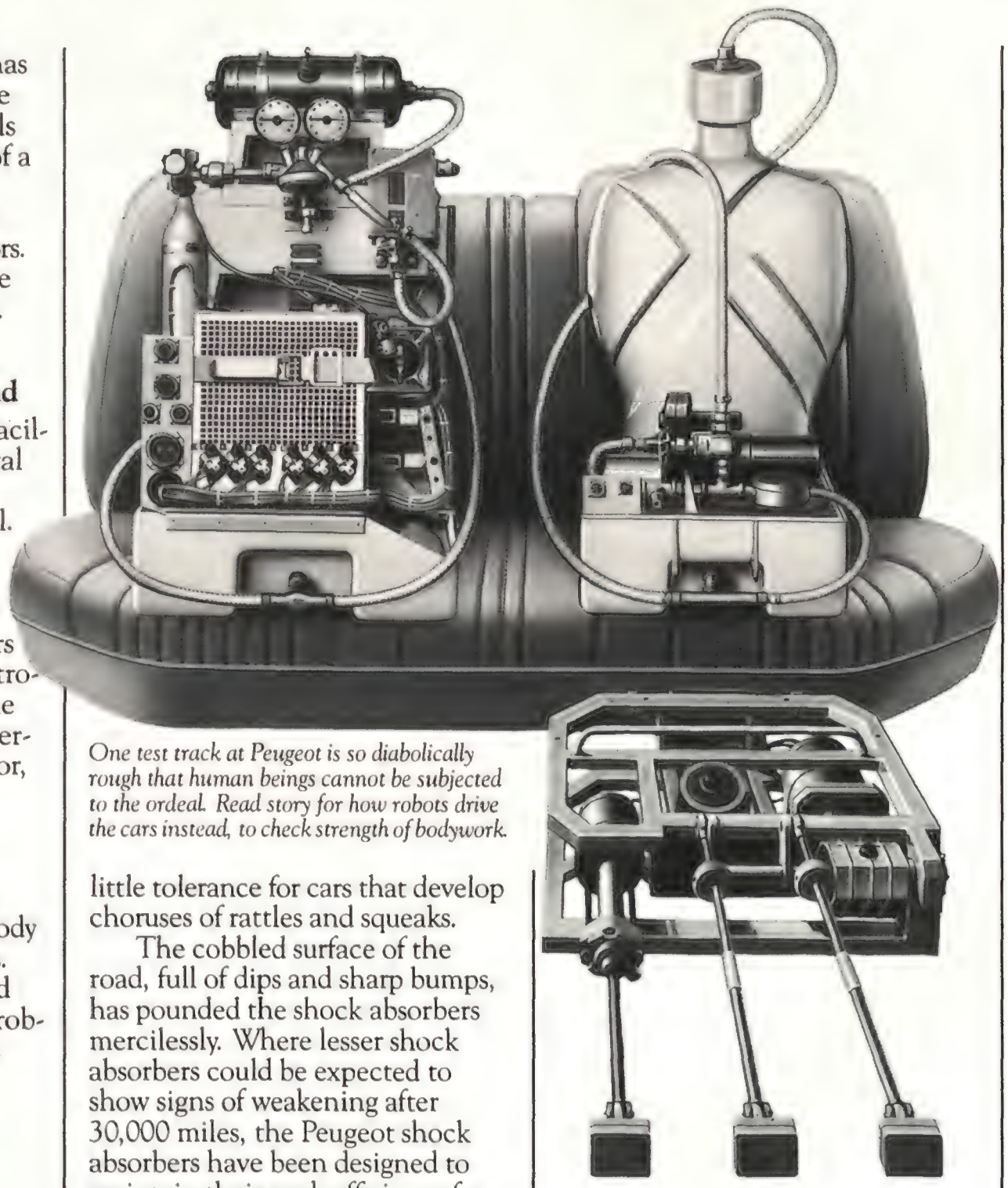
The place is a Peugeot testing facility in Europe. The road, so brutal that Peugeot will not subject human test drivers to the ordeal. In their place... robots.

For 3,000 torturous miles, the robots have been under the command of a computer. Orders were sent to the car via an electromagnetic cable buried under the road. The "driver" robot has operated the steering, the accelerator, the clutch, the brakes.

A merciless pounding

The car is a Peugeot 505S. Its body is welded rigidly in 3,932 places. The robot testers have punished the body along this vile road, probing for weaknesses. Peugeot has little tolerance for cars that develop choruses of rattles and squeaks.

Sections of Belgian pavé that pound cars mercilessly are replicated on robot test track.



One test track at Peugeot is so diabolically rough that human beings cannot be subjected to the ordeal. Read story for how robots drive the cars instead, to check strength of bodywork.

The cobbled surface of the road, full of dips and sharp bumps, has pounded the shock absorbers mercilessly. Where lesser shock absorbers could be expected to show signs of weakening after 30,000 miles, the Peugeot shock absorbers have been designed to maintain their peak efficiency for 60,000 miles of normal use.

Inside a tough car... soft touches

Lest all this talk of Peugeot's toughness and durability mislead the reader into thinking of the car as some crude, range-riding vehicle, now is a good time to step inside the car.

The interior of the Peugeot 505S teems with soft touches. The seats welcome you like an old friend. They have no jouncy springs; in their place is polymerized foam, molded to the shape of the human anatomy under the guidance of physiologists.

A pleasant surprise: this is a *true* 5-seater, with room in the

back for adult-length legs and adult-height heads.

The heating and ventilating system can be directed to play cool air across your face while simultaneously bathing the rest of you in warm air—a great help in keeping a driver fresh and alert on long trips in the winter.

The radio is a marvel of electronic wizardry. It will automatically scan the dial for the next station, pause a few seconds so you can sample the broadcast, then move on to the next station unless you order it to stop.

A Peugeot winning the car-breaking Bandama Rally in Africa, 1978. The almost eerily smooth suspension helps make Peugeot the best-selling car on the continent, which has some of the roughest roads in the world.

The meaning of "S"

Peugeot does not believe in nibbling you to death with extra-cost options. When you spend $13,520* for a gasoline-engined 505S, this is the "S" (for Special) equipment that comes with the car:

- Factory-installed air conditioning
- Electric sunroof
- Cruise control
- Electric windows
- Digital AM/FM stereo radio with Seek/Scan tuning and four speakers
- Automatic electric antenna
- Central door-locking system—a twist of the key locks all four doors
- Alloy wheels
- Multi-adjustable driver's seat.

So fully equipped is the car that the only other ways to spend your money are by ordering a 3-speed automatic transmission ($360) in place of the 5-speed overdrive manual gearbox, and by specifying metallic paint ($290).

Crotchety about quality

Only rashness bordering on insanity would lead any carmaker to promise you a car free of even a single fault. Human beings make cars, and human beings make mistakes. Peugeot, however, is extremely crotchety about quality.

The Peugeot Lion

The lion has represented Peugeot since 1858. It was Peugeot that built the first car ever sold commercially (1891)...the world's first diesel-powered car (1922)...and the first high-rpm diesel engine (1967).

The company maintains a special team of 75 test drivers. Their job is to put *every single car* through an unusual test on a special track after it rolls off the assembly line.

The driver will personally test the steering, brakes, lights, engine performance, transmission, and suspension. Listen for rattles and vibrations. Check the instruments and controls. Try the heating and air-conditioning systems.

Only then is the car permitted to leave Europe for the U.S.

Peugeot has little tolerance for a poorly made car.

See your dealer for details of Peugeot's limited warranties.

*Based on P.O.E. manufacturer's suggested retail prices. Actual prices may vary according to local dealer. Destination charges, state and local taxes, dealer preparation, if any, and license fees are extra. Automatic transmission optional at extra cost.

For name of nearest Peugeot dealer, call **1-800-447-2882** toll free in the continental U.S. In Illinois, 1-800-322-4400.

Please send me the Peugeot Facts Kit, complete with brochures, road tests by leading car magazines, plus list of my nearest dealers.

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The Peugeot 505S, from the second-largest carmaker in Europe. A car that does not nibble you to death with extra-cost options.

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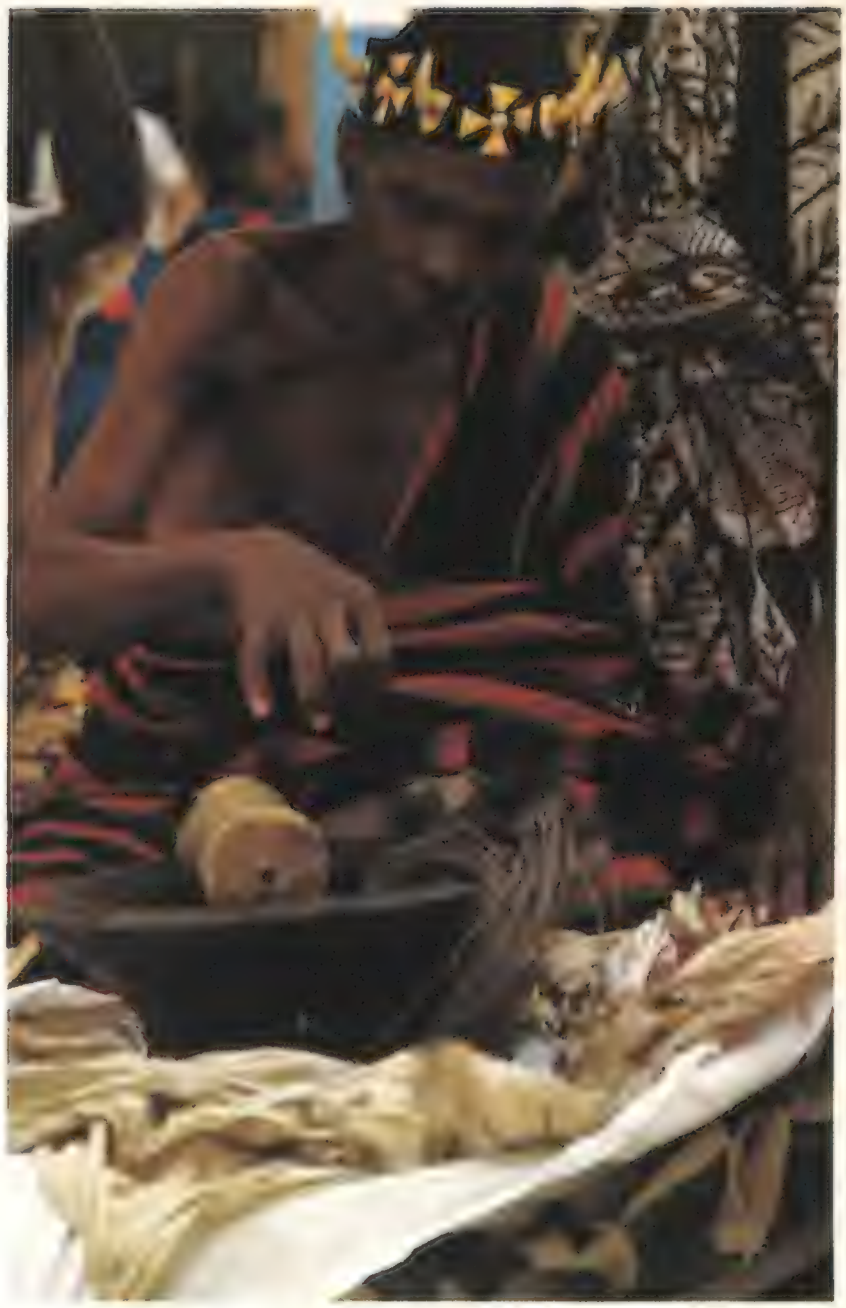
Text and Photographs by Edward S. Ayensu

A worldwide role for the healing powers of plants

Herbalists, relying on medicinal plants, may become a key to improving the health of the human family in the 21st century



Ghanaian healer uses herbs and a fly whisk to purify shrine where trainees graduate.

The therapeutic value and healing powers of plants were demonstrated to me when I was a boy of about ten. I had developed an acute, persistent abdominal pain that did not respond readily to hospital medication. My mother had taken me to the city's central hospital on several occasions where different drugs were tried on me. In total desperation, she took me to Egya Mensa, a well-known herbalist in my hometown in the Western Province of Ghana. This man was no stranger to the medical doctors at the hospital. He had earned the reputation of offering excellent help when they were confronted with difficult cases where Western medicine had failed to effect a cure.

After a brief interview, not very different from what goes on daily in the consulting offices of many general medical practitioners in the United States, he left us waiting in his consulting room while he went out to the field. He returned with several leaves and the bark of a tree, and one of his attendants immediately prepared a decoction. I was given a glass of this preparation; it tasted extremely bitter, but within an hour or so I began to feel relieved. The rest of the decoction was put in two large bottles so that I could take doses periodically. Within about three days the frequent abdominal pains stopped and I recall regaining a good appetite. I have appreciated the healing powers of medicinal plants ever since.

Datura candida, used by herbalists to cure insomnia, possesses sleep-inducing alkaloids.

My experience may sound unusual to those who come from urban areas of the developed world, but for those in the less affluent nations such experiences are a common occurrence. In fact, demographic studies by various national governments and intergovernmental organizations such as the World Health Organization (WHO) indicate that for 75 to 90 percent of the rural populations of the world, the herbalist is the only person who handles their medical problems.

In African culture traditional medical practitioners are always considered to be influential spiritual leaders as well, using magic and religion along with medicines. Illness is handled with Man's hidden spiritual powers and with application of plants that have been found especially to contain healing powers.

Over the years I have come to distinguish three types of medicinal practitioners in African societies,

West African women dance during initiation as herbalists. Vines around their necks are *Momordica.*

and to classify the extent to which each uses medicinal plants. The first is the herbalist, who generally enjoys the prestige and reputation of being the real traditional medical professional. Some herbalists are unassuming people. Others are very colorful individuals who adorn their wrists and necks with talismans, and thus remind one of a Western medical doctor in a white coat with a stethoscope around his neck. The second group represents the divine healers. They are fetish priests whose practice depends upon their purported supernatural powers of diagnosis. While traveling in villages and towns in West Africa, one is likely to encounter signboards with an inscription and an arrow pointing to the home of a spiritual or divine healer. On occasion they also treat patients by using plants that are supposed to have special spiritual powers. Thirdly, the witch doctor is the practitioner who is credited with ability to intercept the evil deeds of a witch or who has the ability to exorcise an evil spirit that possesses a patient. Plants thought to have exorcising powers are used as part of the treatment paraphernalia.

All three kinds of practitioners are held in very high esteem in African societies because throughout history they have managed to keep the rural and urban populations in reasonable health. They have done so by relying almost exclusively on herbs for actual treatment, while serving as the people's spiritual leaders and psychologists.

In the spring of 1979 I had a singular opportunity of observing firsthand in Ghana the initiation of three young men and an older woman into the training program of a traditional healer. I visited this herbalist, introduced myself, and in about the same breath asked whether I might witness the initiation of his new recruits. To my amazement he beamed with joy and expressed his willingness to give both a verbal account of the entire three-year program and a demonstration of the preparation of the candidates before they actually begin to practice.

What kinds of people enter a training program to become traditional medical practitioners? I learned that very often a person going about ordinary daily routines or attending some religious ceremony suddenly hears "a voice." Without much warning he may fall into a trance, apparently possessed by a spirit. The

Newly ordained Ghanaian fetish priest, in trancelike dance, prepares for his role as a spiritual healer.

Vines and roots of *Aristolochia ringens* are used in India for digestion, blood pressure.

Aristolochia seeds are used in Africa as a source of a medicinal oil and an acid.

Bixa orellana seeds are used for many diseases in Mexico, the West Indies and West Africa.

Momordica charantia provides fruit juice to treat diabetes; its leaves treat hypertension.

Heliconia rostrata, inedible relative of banana, is used for skin cancers in Panama.

Annona reticulata, custard apple, has medicines for different ailments in its roots, bark, seeds.

relatives will quickly call in a qualified traditional medical practitioner to interpret what is going on. After the recitation of various incantations, the relatives are told that a spirit of a particular god in the possessed person's lineage would like to see him enter herbal practice.

If the relatives and prospective herbalist concur, the new student is first taken to a cemetery where he is given a ritual bath so that he can make contact with the spirits of his ancestors. While witnessing a demonstration of this very complex ceremonial bath, I noticed that parts of several plant species had been stuffed in a bucket of water, including bundles of African cucumber, *Momordica charantia* (above). This plant is also used in India and Pakistan to reduce fever and promote the secretion and flow of milk in nursing mothers, and in the West Indies it is used against rheumatism, fever and in birth control.

Immediately after the ceremonial bath the trainee is advised to observe certain taboos. The first and the most important instruction is to practice celibacy. If during the course of the three-year training he fails to observe this rule and still wants to become a herbalist, he will be required to make a sacrifice to the god at the shrine and commence his training all over again. In addition, the trainee is not allowed to take any alcoholic beverages, quarrel or fight with anyone, solicit the help of his particular god to harm anyone, go out at night, or serve the chief of his village or any of the chief's court. He is advised to dress very simply, usually in a piece of white cloth. He is also shown how to salute his elders correctly by bending the right

Jatropha gossypiifolia treats many complaints, contains caffeine and hydrocyanic acid.

Opuntia basilaris, a cactus of western United States, is used as a diuretic by the Indians.

Passiflora coccinea, used for insomnia in West Indies, contains sedative passiflorine.

Theobroma cacoa, cocao plant, acts as a heart stimulant; its roasted seed oil is used as a suppository base.

Discorea composita, a true yam, yields diosgenin for birth control, asthma and arthritis.

Bark of *Maesobotrya barteri* in water yields one of many herbal medicines for inducing abortion.

knee and touching the ground with his right hand.

The first year of training is generally devoted to instilling discipline in the students. Although not isolated from the village community, a student is not encouraged to mix too freely with the village folk. He is encouraged to develop a distinctive personality by not cutting or combing his hair.

The second year brings the most important part of herbal training. The student is taken into the forests where he begins to study the local names, to hear recounted their descriptions and to learn the uses of plant parts. I had the good fortune of being asked to accompany a second-year trainee and his instructor into a shady enclave near a wayside cemetery. While en route to the bush, the instructor impressed upon the trainee the need for extreme concentration on the aspect of training they were about to undertake, since it involved the therapeutic portion of his program.

Beneath a lovely tree, the instructor picked up a big red bell-like flower known locally as "red tears" or African tulip tree, *Spathodea campanulata.* The first statement made by the instructor, who held the flower with extreme satisfaction, was: "Every plant you see in the forest was placed on this Earth by the Divine Providence with some specific purpose in mind. For example, this flower, when crushed with the bark of the same tree, is used for treating ulcers. The leaf decoction is excellent for gonorrhea, while one prepared from the tree bark is very good for kidney problems. It is therefore absolutely essential that you pay particular attention to the characteristics of the various plant parts, the location of the trees and shrubs, as well as

the spiritual instructions you receive from your deity."

The trainer emphasized to us that students must listen to various sounds while in the forest and observe the behavior of animals such as rodents, lizards, chameleons, snakes, birds and insects.

To stress his point, the trainer narrated his observation of a fight between two chameleons. At the climax of the fight one of the chameleons passed out. The other quickly dashed into a thicket and came back with a piece of a leaf in its mouth. It forcibly pushed the leaf into the mouth of the unconscious lizard. In a matter of two to three minutes the defeated chameleon shook its body and took off.

The specific plant that saved the life of the chameleon was not disclosed to me. When I insisted on knowing, the teacher smiled and said, "This is a trade secret. It is a plant that can spring a dying person to life. Unless you become one of us I cannot tell you."

The last phase of second-year training involves the adornment of the student's wrist, ankles, neck and long hair with various charms. The prospective healers are also taught how to offer a sacrifice to the gods by killing a live fowl and allowing its blood to flow over a fetish, or idol.

The final year is characterized by the art of water gazing. The student is taught how to gaze into a bowl of water with intense concentration so that he can see the faces of spirits or ancestors with whom he wants to communicate. During this period the trainee is further instructed to sharpen his ability to hear "voices," so that he can better interpret what the spirits or ancestors are trying to communicate to his patients. The end of the training program is charac-

Dr. Ayensu directs the Smithsonian's Office of Biological Conservation. His recent books include Medicinal Plants of the West Indies.

Modern herbalist in Ghana prepares drugs from plants, uses charts to explain effects.

In India, modern herbal pharmacy represents new wave of traditional medical practices.

An open market well stocked with medicinal plants is typical "drugstore" in West Africa.

terized by the entering of a secret covenant between the trainer and the student. The oath of allegiance, or mutual fidelity, is established when the trainer is satisfied that the student has mastered his craft and can pass as a full-fledged medical practitioner. The licking of each other's blood, drawn from incisions made on their right wrists, is the final act of solidarity, as binding as the oath taken by medical students when they are awarded their medical degrees. A graduation ceremony performed in the open is conducted so that the entire village will recognize the new traditional medical practitioner in their midst and begin to use his services, although it takes several years before this new practitioner becomes a master.

Chief Joseph Olusola Lambo of Nigeria, in a recent interview for the Voice of America, described his own introduction to herbal medicine at the age of 15 some 40 years ago. Currently president of the Nigerian Association of Medical Herbalists, Chief Lambo became interested in traditional medicine as a result of a severe headache he had while very young. A relative escorted him to a village where a traditional medical practioner washed young Lambo's head in a pool with a locally made soap containing native medicine. Soon after this treatment, his headache vanished. He was so impressed that he began his own research into herbalism. To him that was "science in action."

Much to learn from herbalists

Chief Lambo's youngest brother, Dr. Thomas Lambo, is the deputy director-general of the World Health Organization and an internationally recognized psychiatrist. They are both very much concerned about the relationship between traditional medical practice and modern medicine. Chief Lambo explains that "In the olden days the relationship was very strained because the modern doctors did not believe in traditional medicine. They did not want even to see traditional healers. But lately they have found out that there is a lot to be gained from traditional medicine." The situation has improved so much that at the Drug Research Center at the University of Ife, in Nigeria, a herbalist is employed as a full-time consultant to Dr. Abayomi Sofowora's plant chemistry program. Dr. Sofowora and his colleagues, while well-versed in modern scientific research, recognize the importance of herbal medicine and believe there is much to learn from reputable herbalists.

During a recent trip to New Delhi, I visited several "drugstores" filled with only locally manufactured medicinal plant products. One of the storekeepers handed me a tin of medicine labeled *Baidyanath Chyawanprash Avaleha*. "Take this and use it. It builds up vitality and memory. It can also cure

Peppers are Asian, African base for many herbal remedies.

Chinese chest is traditional cornucopia of medicinal herbs.

Packaging promotes new image for China's herbal medicine.

bronchial and respiratory diseases. You can use six to 12 grams with milk or honey twice a day. It will be good for you," he said.

I picked up some well-packaged bark and roots of *Rauwolfia serpentina*, a plant that was very well known in ancient Asiatic medicine and contains the alkaloid reserpine. Before I could ask any questions about it, the storekeeper said, "This is a very important plant. It contains a lot of very powerful chemicals. Do you know that this plant has the power to lower your blood pressure and your pulse? Do you know of anyone who has hypertension? This is the best medicine for it. Well, we also use it to calm down mad people, because alkaloids in the plant have specific influence on the mind." The storekeeper, I later learned, had a medical degree from one of the Indian universities but chose to administer herbal medicine because he felt his people were better off with local medicines than with the expensive, imported synthetic drugs that had no traditional, social or psychological meaning.

He proceeded to lecture me on the fact that India was one of the countries that had pioneered the development and practice of subsequently well-documented indigenous systems of medicine, the two most notable being the "*Ayurveda*" (Hindu) and "*Unani*" (Greek and Islamic). He stressed that the materia medica of these two systems encompasses a rich heritage of indigenous herbal practice that has helped to sustain the health of the peoples of India for centuries. "I am very much pleased and satisfied that after training as a modern medical doctor I have returned to our kind of medicine, which is most suitable for us," he told me.

In the neighboring Himalayan kingdom of Nepal, at the Royal Drug Research Laboratory, where an impressive program of medicinal plant research is being conducted, I met with the director general, Dr. S. S. Malla, who also expressed tremendous satisfaction in the increased attention to herbal medicine in his country and abroad. He proceeded to remind me that medicinal plants have played an important role in Hindu culture, as shown in the *Rigveda*, which is said to have been written between 4500 and 1600 B.C. Then he added, "It is unlikely that the Hindu culture will abandon such a rich heritage, especially in the face of escalating prices of Western drugs."

While on a tour of the research facilities, I was prompted to pose several questions concerning the acceptability of herbal medicine, especially among the Western-educated Nepalese. "Deep down they all trust the local medicines. Some of the crude drugs, species of *Rauwolfia, Ephedra, Aconitum* and *Nardostachys*, are still very popular for the cure of hypertension and many heart diseases," reported one of the staff members.

In recent years, medicinal plants have been recognized widely as "chemical factories." The Eurasian aroid *Acorus calamus*, for example, used currently in 51 different drug preparations because the rhizomes contain an essential oil with insecticidal and sedative properties, is under heavy collecting pressure.

Around the world, the bulk of the raw materials used in preparing drugs are mostly collected from the wild. In fact, heavy collecting of certain plants for local as well as foreign pharmaceutical markets has become a major problem. A striking example is the depletion of a much sought-after species of yams (*Dioscorea*), whose chemical compound diosgenin is used as the foundation material in the manufacture of birth control pills.

Vincristine, the chemical derived from the Madagascar periwinkle (*Catharanthus roseus*) sells for more than $100,000 per pound. It has led to a remarkable decrease in mortality among young leukemia patients. In China, at present, literally every available soil suitable for the growth of this plant is under cultivation. Because of the low yield of vincristine from *Catharanthus roseus*, it is necessary for the Chinese to process at least 100,000 kilograms at a time in order to recover

a reasonable yield of the alkaloid. The leaves represent about ten percent of the total dry weight of the plant. Therefore the Chinese usually process about 900,000 kilograms of dried plants at a time.

The People's Republic of China is perhaps the leading country in systematically amalgamating herbal medicine into natural health-care systems. In several visits to China, I have had the opportunity to observe the practice of herbal pharmacology on a mass scale.

On the outskirts of Peking, for example, there is an experimental plantation for the Institute of Materia Medica. This establishment, covering about 64 acres, contains some 1,500 species of well-tended medicinal plants. "Here about 10,000 barefoot doctors are trained every year to gain experience in the cultivation of medicinal plants," an Institute official explained. "Our population is big, therefore we need more such doctors to work with the people in the cities as well as the remote areas." The plantation is also recognized as a reliable supply house where pharmaceutical research laboratories obtain sufficient authenticated plant material for biological evaluations or chemical studies.

Another establishment specializing in medicinal plants is the Guangdong Provincial Botanical Garden, in Canton. My host, Professor Chen, is vice rector of the Provincial Institute of Botany and the director of the Garden. On a tour of these 500 acres, containing more than 3,000 cultivated species, Professor Chen began to quiz me on the names of plants that he pointed out. I soon realized he was selecting plants native to Ghana! "You are very familiar with your native plants; that's good," he said. "I collected all these plants from your country about 12 years ago."

I expressed special interest in the medicinal plants and orchids in the garden, and this led to extended discussions on the uses of herbal medicine as an important component of the health-delivery system for his country. Within two hours I saw more than 40 medicinal plants that are under active investigation.

In traveling through the developing world, I am pleasantly surprised to find mounting interest among even the best-educated people in traditional medicine. This observation is particularly true of people in the Indian subcontinent. The educated public in Africa and Latin America still have some way to go in reeducating themselves. I am particularly disturbed by Third World Western-trained doctors who show total disregard and disdain for the importance that herbal medicine plays in the world's health situation. Some of these doctors are even ashamed to admit that their parents relied on these ancient folk remedies to treat and save their lives during childhood. Many of the Western-trained doctors seem to have been brainwashed into believing that only drugs originating in the developed countries have healing powers.

Some of these same doctors seem unaware that the major pharmaceutical houses are constantly searching for new active compounds from the medicinal plants of developing countries. Confronted with mounting prices for drugs, particularly the synthetic drugs derived from petrochemicals, chemists are turning their attention back to herbs in their search for new drug substances that have to this day eluded them. Furthermore, many developing countries are aware that their native medicinal plants are imported into the developed countries where they are screened, analyzed and used in drug preparations, only to be returned to them at exorbitant prices. This situation has been described by Dr. Halfdan Mahler, director-general of WHO, as "drug colonization."

For health, social and economic reasons it seems clear that developing countries should begin an extensive program aimed at an examination of the most important medicinal plants. At the moment, information on such plants in most countries is dispersed and unorganized. Much of it is in the heads of aging herbalists who represent a dying breed.

But there is a general feeling among specialists that gradually the magic, superstition and dogma that sur-

African vine *Strophanthus* yields poisons and a heart stimulant.

Flowers of African tulip tree *Spathodea* are applied to ulcers.

Madagascar periwinkle is source of drug used to treat leukemia.

round medicinal plants are giving way to understanding the real basis of the curative powers of these plants. The proliferation of information on "natural foods" has influenced the recent great interest in herbal remedies.

More and more people realize that a substantial number of the prescriptions bought from drugstores contain different crude plant products. In 1973, the last year in which good data were available on prescriptions in the United States, it was shown that of the 1.532 billion prescriptions sold in pharmacies throughout the United States, 41.2 percent contained natural products, and of these 25.2 percent were products from flowering plants. If prescriptions offered by state and federal hospitals in the United States alone are considered, it is estimated that prescriptions containing flowering plants or their products amount to $4 billion a year.

For those in the affluent world, it may seem inconceivable that about 85 percent of the world's population in the poor nations, when they are ill, do not consult medical doctors and may never enter a hospital from the time they are born until they die. But such statistics have prompted the World Health Organization, after many years of benign neglect, to initiate a program to promote and develop traditional medicine to be carried out throughout the developing world.

Traditional medicine "needs to be evaluated, given due recognition and developed so as to improve its efficacy, safety, availability and wider application at low cost," according to WHO reports. "It is already the people's own health-care system and is well accepted by them. It has certain advantages over imported systems of medicine in any setting because as an integral part of the people's culture, it is particularly effective in solving certain cultural health problems. It can and does freely contribute to scientific and universal medicine. Its recognition, promotion and development will secure due respect for a people's culture and heritage."

Dr. R. H. Bannerman, until recently the Program Manager for Traditional Medicine at WHO, summed up the current feeling on traditional medicine as follows: "There are those who take a hostile attitude toward traditional medicine, and those who, without reservation, accept all things handed down by tradition. Both of these attitudes are indeed wrong. The more realistic tendency which is emerging is discriminating and discarding the crude and harmful

Array of medicinal plants in a West African market reflects popular reliance on herbalists.

practices while retaining the refined and useful methods for further development and application."

All countries belonging to WHO have pledged to provide primary health care for all their people by the year 2000. Obviously, we cannot continue to rely exclusively on the administration of Western medicine. This is particularly self-evident when we realize that, for example, there are more medical doctors currently within the metropolitan Washington, D.C., area than there are in all of Black Africa. As traditional medicine gains the respect of our modern societies, there is the likelihood that a new breed of practitioners will emerge. I can foresee a transformation: the development of very well-educated herbalists who can write down their diagnoses, follow up their clinical observations, and record the efficacy and safety of the herbs administered. Finally, one hopes the traditional healer will retain the trappings of his medical practice and maintain his psychological position in the community.

It is not only the developing world that will benefit from increased research and awareness of our medicinal plant resources. An example is the investigation of plants that are likely to cure certain cancers. In recent years herbalists have reported cases of spontaneous tumor regression in their patients. The herbalists maintain that certain medicinal plants stimulate the body's natural defenses and bring about such regression. The approaches of these traditional healers should not be overlooked or described as simplistic. It is not inconceivable that the powers of plants that have kept Man in reasonable health over the centuries will again rise to the occasion in combating cancer if we continue to unlock the active compounds that lie, perhaps, in ordinary plants that surround our homes and are abundant in the fields.

Alaska

Spectacular scenery is just the beginning.

GOLD Alaska loves its gold rush history. Today its towns still teem with high-kicking, knee-slapping frontier-style fun: can can dancers, free-spirited saloons, riverboat paddlewheelers, comic opera, and even a narrow gauge railway.

ESKIMOS The unique nature of Arctic Alaska has produced a people with inner strength and captivating warmth. Their sensitive artwork, inviting hospitality, and fascinating culture are a part of Alaska you're not likely to forget.

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FESTIVALS Russia ruled Alaska until 1867. Later, Scandinavian immigrants founded many of the first towns and villages. You can see Russian folkdances, onion-domed churches, and take part in a "Little Norway" spring festival.

SOURDOUGH Pioneer spunk, a tough yet gregarious spirit, and a pot of sourdough were all Alaskan prospectors needed in 1898. And so they became known as Sourdoughs. Their stories and mouthwatering recipes are still a very real part of Alaska.

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By Sterling Seagrave

War at sea seared Americans before Pearl Harbor attack

To cripple Great Britain, German U-boats turned the Atlantic into a shooting gallery and forced America to the brink of battle

Long before Pearl Harbor, America was already deeply involved in one of the climactic battles of World War II. Her involvement was probably inevitable from the moment on October 13, 1939, that U-boat skipper Günther Prien guided the *U-47* into the dark harbor of Scapa Flow in the Orkney Islands—half a world away from Hawaii—and sank the mighty British battleship *Royal Oak*. That sneak attack on October 13, only six weeks after the war broke out, marked the beginning of the battle of the Atlantic, a ruthless campaign waged by Germany's U-boats against the merchant convoys that were keeping Britain from surrender. These paintings by John Hamilton, from the Imperial War Museum in London, recapture its highlights, from the first bloody wolf-pack attack to the sinking of the first U.S. Navy ship in World War II on the eve of Pearl Harbor.

A year after Scapa Flow, slipping stealthily through the dark waters of the North Atlantic, the German submarine *U-48* crossed directly into the path of an immense convoy of 34 merchant vessels, guarded only by a ragtag escort. Quickly, Lieutenant Commander Heinrich Bleichrodt radioed U-boat command, then moved into firing position.

Convoy SC-7 bore down on *U-48*. Bleichrodt could hardly miss. One torpedo hit the British freighter *Scoresby*, another the French tanker *Languedoc*. As the convoy escorts dashed about in frantic search for the attacker, Bleichrodt withdrew, planning to attack the next night with a new weapon—the wolf pack.

As *U-48* sped away on the surface in the first light of dawn, a British Sunderland flying boat caught sight of her and alerted the convoy escort. Bleichrodt was obliged to submerge and remain below for eight nerve-wracking hours till the hunters gave up and hurried off after their unguarded convoy.

By dusk on October 17, guided by U-boat command, other submarines were closing in: *U-101*, joined by U-boat aces Otto Kretschmer in *U-99* and Joachim Schepke in *U-100*. Finally *U-123* and *U-46* came up. The pack formed a patrol line ahead of the convoy and attacked when the convoy arrived next evening. One by one the victims burst into flames (above). When the night ended, only 13 ships remained. The battle of the Atlantic had entered a terrible stage.

Paintings by John Hamilton

On a night like this, Convoy SC-7, thinly guarded, met the first German wolf pack, five U-boats lying on the surface under a full moon. Ship after ship was torpedoed: 21 out of 34 in the convoy were sunk.

The wolf packs were the brainchild of Commodore Karl Dönitz, head of Germany's submarine force. Dönitz believed that the only way to defeat Britain was to sever her fragile seaborne lifelines, a job that could be done only by his U-boats. If Hitler would authorize the construction of 300 U-boats, argued Dönitz, he could bring Britain to her knees. Winston Churchill later wrote: "The only thing that really frightened me during the war was the U-boat peril."

Hitler, however, had served as an army corporal in World War I and saw himself as a great military strategist on land. While he enthusiastically supported the Luftwaffe, he had a profound suspicion of the sea. The magnificent cruisers and pocket battleships that Germany built were hampered in operations by Hitler's intense fear of losing them. "On land I am a hero," he said. "At sea, I am a coward."

To aggravate matters, the German submarines had got off to an embarrassing start. Barely ten hours after the war began, a U-boat had torpedoed the British passenger liner *Athenia*. Of 1,400 passengers, 112 died, including 28 Americans. Germany was then still operating under the terms of international law and agreements that barred attacks without warning on enemy passenger and merchant ships. The U-boat commander had violated these restraints, and the sinking caused international outrage. The disaster was most embarrassing to Hitler; however, a few days later, the Nazi press blamed it all on the British.

Dönitz needed a spectacular triumph to win Hitler

In HMCS *Snowberry* and other tough corvettes,
Royal Canadian Navy escorted convoys from Halifax.

Surfaced in mid-Atlantic, *U-309* watches for the wisp of smoke that, in pre-radar days, spelled target.

over. The destruction of Britain's famous *Royal Oak* at Scapa Flow was made to order. When she went to the bottom with 833 officers and men, and *U-47* slipped away into the night, Günther Prien looked back and noted in his log: "The glow from Scapa Flow is still visible. . . ."

Germany was ecstatic at Prien's triumph, and Hitler removed restraints on U-boat attacks against Allied merchant ships. A month later the restriction on attacking passenger ships was dropped. Every ship in the Atlantic became fair game.

More than 3,000 ships were supplying Britain with men and war materiel, and on any given day 2,500 of them were at sea and terribly vulnerable to attack. Against them the Germans arrayed every type of surface warship, including disguised armed merchantmen. The seas were pearled with mines. While surface raiders patrolled the North Atlantic and ranged even to Cape Horn and the Pacific islands, the ever-increasing fleet of U-boats set up pickets all around the British Isles, concentrating on the western approaches.

As sinking followed sinking in the Atlantic, American opinion was heavily influenced in favor of Britain's valiant fight for survival. President Franklin D.

Tactic of ace Otto Kretschmer in *U-99* was to rise at night in the midst of a convoy and blast away.

Roosevelt worked diligently to turn the conscience of the people into action. His first move was to rally Latin American republics to declare the entire Western Hemisphere neutral. In Congress, Roosevelt worked to reverse the Neutrality Act, which kept merchant ships from ports of the combatants, prohibited arms sales and required cash for raw materials. Two months after war began, Roosevelt was able to allow arms sales on cash-and-carry terms.

From that moment, America was in a position to support both England and France indirectly, without violating the letter of the law, and without giving Hitler direct grounds to declare war on the United States. The best Germany could do was to destroy shipments before they reached their destinations.

Neither France nor Britain was adequately prepared to defend the Atlantic lifeline. Merchant ships were grouped together into convoys and, to escort the convoys, the Admiralty ordered 56 new corvettes, uncomfortable but seaworthy 925-ton vessels that were able to survive the Atlantic's worst weather. They bobbed and tossed like corks (p. 102), causing even the hardiest officers to be seasick, but they did the job and they were cheap.

By the end of 1939, after only four months of war, 215 merchant ships had been sunk—748,000 tons of shipping—with a loss of more than 1,500 lives. Germany began this onslaught with only 22 oceangoing U-boats. They faced a long haul out of home waters, around the Orkneys into the battle zone of the Atlantic, and a long haul back for refitting. Dönitz wanted more U-boats, but his battle was not the only one facing Germany.

On May 10, 1940, the blitzkrieg began that took German armies across Holland, Belgium and into France. Norway fell in June. France fell a week later. That gave the U-boats bases in Brittany and the Bay of Biscay, extending their range, eventually, to the coast of North America.

Elderly U.S. destroyers help Britain

As continental Europe fell to the Germans, Churchill asked Roosevelt for the loan of 40 or 50 old American destroyers. Roosevelt found himself in a predicament, but a solution soon presented itself. The isolationists had long wanted Britain to relinquish its bases in the Western Hemisphere. If Britain gave up those bases in return for the mothballed destroyers, the isolationists would be appeased. So, just as Germany's U-boat arm extended its Atlantic pickets from Occupied France, Britain was able to bring the elderly U.S. four-stackers into play.

There were more than U-boats for the British to contend with. The Germans converted nine old freighters into fast, powerful gunboats able to disguise themselves as harmless neutral merchant vessels. They changed their profiles, colors and flags with cunning artificial smokestacks, fake deck cargoes and concealed gun positions. Coming up innocently on unsuspecting merchantmen, these raiders suddenly dropped their disguise, lowered their gun covers and blasted their victims to the bottom.

Most famous of the raiders were *Atlantis, Thor* and *Kormoran.* In 20 months *Atlantis* captured or sank 20 ships before being sunk by a suspicious British cruiser. *Thor* sank a British raider and fought two others to a draw. *Kormoran* ranged far and wide terrorizing Atlantic shipping, and ended her life in a bitter duel in which she sank her attacker before going down.

Germany's battle fleet had consisted of 34 destroyers, eight cruisers, two small battleships and the three pocket battleships *Graf Spee, Admiral Scheer* and *Deutschland.* After running rampant the length of the Atlantic, *Graf Spee* was hunted down off Argentina by a British task force and took refuge in the neutral port of Montevideo. There her captain scuttled her rather than risk capture or sinking by the enemy.

Two other Nazi battleships joined the German

Convoys bound for Russia faced savage winter gales or dangers of nearly constant summer daylight, so they

Torpedoed American Liberty ship goes down as watch on corvette bridge search for survivors. Such prefabricated freighters were built at assembly-line speed, then were sailed straight into violent action.

were routed north to brave the ice packs and bergs rather than Norway-based U-boats and planes.

American Liberator bomber with British markings flies from Iceland to meet convoy and so close the mid-Atlantic gap, where escort vessels were few. RAF flyers kept U-boats submerged and vulnerable.

fleet after the war began—*Bismarck* and her sister ship *Tirpitz*. The magnificent *Bismarck* was pursued and trapped in the North Atlantic by two separate fleets of British warships. *Bismarck* fought valiantly in company with the heavy German cruiser *Prinz Eugen*. In a showdown with the British battleships *Hood* and *Prince of Wales*, the German warships exchanged salvos with their enemies from opposite horizons. A German shell struck *Hood*'s powder magazine and the mighty dreadnought was literally blown to pieces (p. 107). Outgunned, *Prince of Wales* withdrew.

But the British gave *Bismarck* no chance to slip away. The harrying pursuers dogged her as she sped for safety on the French coast. On May 26, 1941, she was spotted by an RAF Catalina patrol plane, and a flight of 15 antiquated Swordfish biplanes took off from the flight deck of the carrier *Ark Royal*. One air-dropped torpedo struck *Bismarck*'s steering engine room, jamming her rudder.

By dawn the British were upon her, with the battleships *King George V* and *Rodney* and the heavy cruisers *Norfolk* and *Dorsetshire*. As they approached they opened fire, and the devastating salvos closed finally to barely two miles—point-blank range. Miraculously, the doomed *Bismarck* resisted sinking till 10:15 A.M., when the last of her crew abandoned ship and the titan rolled over slowly and slid down.

Hitler wouldn't risk last battleship

Hitler's rage at the loss of his most impressive warship caused him to withdraw most of the remaining big German surface ships from Atlantic duty, but not before the battleships *Prinz Eugen, Scharnhorst* and *Gneisenau* had cut their swaths across the North Atlantic. So fearful was Hitler of losing his last battlewagon, *Tirpitz*, that he restricted her to the coast of Norway, where she preyed on convoys to Russia.

Although Germany's surface warships were proving vulnerable, her U-boats, as Dönitz had predicted, were wreaking havoc on shipping, with relatively few losses. Leading the wolf packs was U-boat ace Otto Kretschmer, a slim, sardonic and sober professional—the very antithesis of the boyish and egocentric Günther Prien. Kretschmer was rapidly overtaking Prien as Germany's leading submariner.

Kretschmer's style was like shooting a double-barreled shotgun at a barn door. Placing his *U-99* directly in the path of an oncoming convoy at night, he remained silent on the surface or just below till the vanguard of the convoy passed right over him. Then, rising in the convoy's midst, he would let fly all his torpedoes, knowing that he could hardly fail to hit home with most of them (pp. 102-103). So long as the U-boat remained on the surface, it was undetectable

by the asdic underwater detection gear (named for Allied Submarine Detection Investigation Committee) and practically invisible in the darkness.

If a U-boat were forced to dive, it became terribly vulnerable, and the crews learned to dread the first *ping-ping* as the asdic sent its signals out to stroke over the submerged hull. Once located by asdic (the American version was called sonar), escape was difficult for the U-boat. Pattern after pattern of depth charges would batter the fragile steel coffin. If the U-boat survived, its men were often so stricken by the hours or days of terror in the deep that, to restore sanity, their captains had to search for another target.

The daring of Otto Kretschmer and other aces was spectacular, but if the U-boats were to cripple Britain the convoys had to be halted. To do this, Dönitz strung his submarines in a loose picket to wait for radio confirmation that one of them had sighted a convoy. The others would then converge and attack together. The full brunt of this strategy was felt in the summer and fall of 1940. By the end of that terrible winter, however, new antisubmarine techniques and American aid radically altered the outcome.

That winter Churchill audaciously asked Roosevelt to give Britain five billion dollars' worth of aircraft, weapons and merchant ships. Roosevelt had just been reelected to an unprecedented third term, but he could not expect Congress to meet such an exorbitant request from Britain. Instead, he solved the problem with an impressive sleight of hand. Granted, if Britain could not pay cash for its purchases, they would be blocked by the Neutrality Act. On the other hand, the British bases traded for the mothballed U.S. destroyers had not been "given" or "sold" to America, just turned over on a 99-year lease. If that could be done, why not simply "lend" Britain the planes, guns and ships she needed, to be returned after the war? It came to be called Lend-Lease.

"Suppose my neighbor's home catches fire and I have a length of garden hose," Roosevelt said at a press conference. "I don't say to him: 'Neighbor, my garden hose cost me $15; you have to pay me $15 for it.' No! I don't want $15—I want my garden hose back after the fire is over." Congress agreed, and passed the Lend-Lease bill on March 11, 1941.

On March 6, when passage was virtually certain, Convoy OB-293 was plowing through the Atlantic from Liverpool to Halifax, Nova Scotia. At dusk, Günther Prien and the redoubtable *U-47*—the same U-boat he had sailed into Scapa Flow—led a wolf pack down upon the convoy. But before the U-boats could inflict much damage, the convoy escorts descended upon them with unprecedented determination.

Military writer Sterling Seagrave has just written a new book, Yellow Rain *(M. Evans & Co.), about the terrors of chemical warfare. British artist John Hamilton is now illustrating the war in the Pacific for the U.S. Navy.*

Escorts learn to fight back

This time they seemed to know what they were doing as they worked together in coordinated antisub sweeps. Prien was using a rain squall to cloak his attack, but suddenly the squall stopped and he lay fully exposed in the fading sunset to the destroyer *Wolverine*. Astounded, Prien swung away frantically, *Wolverine* gave hot pursuit. Prien abruptly dived. As darkness closed in, *Wolverine* tracked the submerged sub and laid depth charges that seemed to fall right on top of it. Odd noises came over the destroyer's hydrophones, indicating troubles in the U-boat.

Suddenly Prien surfaced, saw *Wolverine* waiting and dived again. Once more the depth charges fell. There was a tremendous blast below. Then, to the surface, came the telltale remains of *U-47*. The victor of Scapa Flow was no more.

Prien was soon followed by a large number of his comrades. On March 16, five days after Congress acted on Lend-Lease, another wolf pack led by the all-time top-scoring U-boat commander, Otto Kretschmer, descended on Convoy HX-112 out of Halifax. Leading the convoy escort was the equally determined British Captain Donald G. F. Macintyre in the destroyer *Walker*.

At twilight, one of the escorts reported a U-boat six miles ahead. Racing to the scene, the escorting destroyers and corvettes began a murderous attack that culminated in a one-on-one battle between the destroyer *Vanoc* and a surfaced U-boat. The U-boat tried to veer away, but *Vanoc* coolly ran it down. As

HMS *Prince of Wales* changes course to miss flying wreckage of the famed battle cruiser *Hood*, torn apart after a salvo from the German *Bismarck*. British planes later caught the Nazi ship and crippled her.

Gallant New Zealand freighter *Tekoa*, right, last ship of a beleaguered convoy, stops to rescue 144 survivors from three neighboring victims. The Allies lost 21 vessels in this devastating attack.

the crushed hull sank into the depths, a British crewman glimpsed the numbers painted on its conning tower: *U-100*. This was the submarine of the German ace Joachim Schepke.

No sooner was it gone than *Walker* picked up yet another U-boat. After only one pattern of depth charges, the U-boat surfaced in the darkness astern of *Walker* and a light flashed out from it signaling in garbled English: "We are sunking."

The destroyer prepared to rescue the German crewmen as they leaped into the dark water. When they scrambled up the rescue nets, the U-boat's skipper came over the side last: Otto Kretschmer.

Prien, Schepke, Kretschmer—in little more than a week three U-boat aces had been eliminated from the battle of the Atlantic. The tide was turning.

There was more than luck behind it. Men like Captain Macintyre (and Captain John Walker, perhaps the greatest escort-group commander of the war) were products of a new convoy-escort policy dedicated to winning the war at sea. Where before they had been hampered by conflicting instructions from command staff ashore, they now had the authority to act on their own. Where before vessels were assembled into groups at random, they were now trained together and stayed together. And where asdic had been useful only against submerged subs, they now had radar and were able to spot surfaced U-boats miles away. They also had aircraft support.

Only one significant hole was left in the defensive network—in mid-Atlantic beyond the range of shore-based aircraft. But in April 1941, the United States extended its protection over Danish-owned Greenland. (Denmark had fallen, but Germany had not penetrated Greenland.)

On April 16, in the South Atlantic, the notorious German raider *Atlantis* attacked and sank the Egyptian passenger liner *Zamzam* with 138 Americans aboard, arousing an outburst of anti-German indignation that was not appeased even when the passengers were set free, unharmed, in Occupied France. Events then moved swiftly. In July 1941, U.S. Marines landed in Iceland to relieve the British troops for duty elsewhere. From Iceland, air cover over the mid-Atlantic hole was achieved for the first time.

On September 4, 1941, as Admiral Isoroku Yamamoto put into motion firm arrangements for the sailing of the Japanese fleet toward Pearl Harbor, a German U-boat off Iceland exchanged fire with the American destroyer *Greer*. "Let this warning be clear," Roosevelt declared. "From now on, if German or Italian vessels of war enter the waters the protection of which is necessary for American defense, they do so at their own risk."

That same September, America put its full industrial genius into the building of Liberty ships, prefabricated merchant vessels. By producing the many components of a ship at factories all over America and organizing them systematically at shipyards, it became possible to assemble an entire vessel from keel

Shattered U.S. destroyer *Reuben James* goes down with heavy loss, five weeks before Pearl Harbor.

to launch in as little as ten days. America thereafter was able to build and launch ships faster than Germany could sink them.

On October 17, the American destroyer *Kearny*, escorting British ships, its guns loaded and manned, was torpedoed off Iceland, but not sunk. In the action, however, 11 men were lost. Fourteen days later, on October 31, as the Japanese fleet prepared to sail across the North Pacific, the American destroyer *Reuben James*, escorting a convoy out of Halifax, was torpedoed and sunk in the North Atlantic with a loss of 115 men (below). She was the first U.S. Navy warship sunk in the battle of the Atlantic. Her sinking prompted the arming of American merchant ships.

On the early morning of December 7, 1941, as Japanese planes left the flight decks of six carriers, the battle of the Atlantic was about to be joined by the battle of the Pacific. The sky over Pearl Harbor was dark, but in the east the glow from Scapa Flow was still visible.

By Nathan Cobb

Illusions become reality for pals of Marco the Magi

Psychologist Cesareo Pelaez masterminds Massachusetts neighbors into spending Sundays onstage in their own magic show

Photographs by Richard Howard

As smiling clowns flank Marco, only the pampered rabbit refuses to wear troupe's mandatory grin.

"Will you make me disappear?" I asked Marco the Magi. "Yes," he answered, smiling. "But before you disappear you should first appear." And so Marco rolled a large box, brilliantly painted and lacquered in Oriental motif, onto the stage. And Marco turned the box around several times so the audience could see that nothing was behind it. And Marco opened the box from the top and tipped it forward so the audience could see that nothing was inside it. And Marco closed the box and tipped it upright and with a gleeful whoop opened it again. And from out of the box, wrapped in a lamé kimono, leapt . . . I!

Marco the Magi is Cesareo Rafael Pelaez, a puckish native of Cuba with graying hair and a faint paunch, who lives in an early 19th-century New England home with three other people and multiple doves, sometimes finds flowers mysteriously tucked beneath the windshield wipers of his 1971 Volkswagen, gave up studying law in Havana about 30 years ago, enjoys almost nothing more than $20-per-bottle Marquis de Montesquiou Armagnac, was once chased by yapping dogs, and has created a spectacular two-and-a-half-hour magic show with 65 adults and eight children who are true believers in the word according to Cesareo Rafael Pelaez.

His lavish production is a cross between an early 20th-century traveling magic show and a 1930s Busby Berkeley movie. It takes place in Beverly, Massachusetts, a diverse city of 37,000 people located about 20 miles northeast of Boston and heretofore most famous as the headquarters of Parker Brothers, manufacturers of the game of Monopoly, among many others. But the newest game in town is Marco the Magi's production of *Le Grand David and his own Spectacular Magic Company*. Most Sundays it materializes twice within the ornate 956-seat Cabot Street Cinema Theatre—named not for one of the more recent Yankee Cabots, who hear only from the Lowells and speak only to God, but for John Cabot, the 15th-century Italian explorer.

Black ink for White Horse

Pelaez and his band are not mere tenants: in 1976, 18 of them formed White Horse Productions, Inc., which paid $110,000 cash for the 56-year-old vaudeville/movie house. They still present classic films during the week and probably lose money doing so, but among the many colors of their magic show—which celebrated its 550th performance last July 4—is the gleaming black of ink. Owners also of $731,000 worth of theatrical hardware and costumes, White Horse cleared about $30,000 in their last fiscal year.

The show begins not with a bang but with a Chinese gong. There are penetrations, levitations, appearances and disappearances. There are singers, dancers, musicians and assorted sidekicks. There are sunshades, fans, feathers and flowers. There are brocades, satins, velvets, chiffons and sequins. To be more precise, there are 359 costumes, some 64 magical props, 20 major illusions, 19 curtains, 17 members of a barbershop "quartet," five doves, four trumpeters, three ducks and, yes, one rabbit (opposite). There used to be goldfish, but sometimes they died right up there onstage, which nearly broke the poor heart of Cesareo Pelaez. So the goldfish illusion was given the hook. "I don't want to kill fish," he says wistfully.

Marco lies "Divided in Two" (foreground) as magic company members and Le Grand David (center stage) assemble for group portrait. Most magicians "saw in half" a slender, petite woman, not Marco-size man.

Logically, none of this should be happening. Five years ago, the only thing the majority of these people could have pulled out of a hat was its lining. Even today, most of them have occupations like computer programmer, social worker, lawyer, librarian, nurse and bank vice president (the latter performs in a mask, lest his customers discover that their money tender spends his Sundays cavorting with Marco). Only 15 members of the troupe are paid, and Pelaez is not among them. The 49-year-old bachelor is a tenured associate professor of psychology at nearby Salem State College, where, not surprisingly, he specializes in theories of motivation and personality. Which means that 1981's "Magician of the Year," as selected by the Academy of Magical Arts, is a part-timer.

Successful? Stand in line on Cabot Street with everyone else an hour prior to show time. Before you experience the smell of greasepaint and the roar of the crowd, you must first encounter the odor of diesel fuel and the noise of the bus; group sales account for almost 30 percent of the tickets, and the last time anyone counted, there had been organized visits from 152 communities. Beaming senior citizens ("but they don't buy too much at the concession stands," Pelaez frets) mix easily with sunburned tourists and saucer-eyed kids as they all make their way through the gaping mouth of a green monster to be greeted by Tassles the Clown, Rita (a player piano) and ushers in tuxedos. At the end of the show, the entire cast gathers in the lobby to wave good-bye, much like camp counselors marking an end to another shared summer. Then the buses pull away and a heavily perspiring Pelaez leaps for his ritualistic paper cup of ginger ale, which he does not in any way equate with Marquis de Montesquiou Armagnac, but which is nevertheless always awaiting him after every performance.

It is his show. Do not be fooled by its name. Oh, Le Grand David (Da-*veed*) exists all right: he is 27-year-old David M. Bull, who works full time for the organization and first met Pelaez a decade ago. Bull is the show's number-two star, running several lengths ahead of Seth the Sensational, a.k.a. Seth Bartlett, age nine, a four-and-one-half-year veteran whose parents are part of the troupe. But the spotlight—onstage as

Nathan Cobb, a writer for The Boston Globe, *bravely appeared, then disappeared and (whew!) reappeared (gasp!) while preparing this article.*

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18 EST EPA MPG 25 HWY EST*

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AT AMERICAN MOTORS

In "Zig-Zag" illusion, show's only 20th-century effect, Marco loses his midriff, David (right) beams.

On knees, Denise Diamond (left) and Donna Brazao paint posters that David bursts through onstage.

well as off—seldom strays from Pelaez, a totally charismatic and often humorous performer in both arenas.

"The story of the Cabot Street Cinema Theatre is subtitled the story of Cesareo Pelaez," admits Webster Bull, David's older brother and the corporation's president. "Marco's the mind and the soul," adds Jacqueline Dorsey, who keeps track of his 42 stage costumes. Small wonder, then, that flowers are occasionally placed on Pelaez's car by unknown hands. "They even sometimes assign people to take care of me as if I were 90 years old," he confesses, laughing loudly, something he does a lot.

Pelaez directs every detail and nuance of the operation, including the sewing of elaborate costumes and the building of complicated props, activities which take place six nights a week on the second floor of an adjoining building. The group also owns a nearby house for storage and use during performances as a nursery for their younger offspring.

Onstage it's smile, smile, smile

He has attracted a disarmingly cordial crew. They cheerfully perform every chore from unlocking the doors to sweeping the floors. Not smiling onstage is cause for reprimand, and broad grins turn up in unexpected places: I saw one on the face of Steven Ozahowski as he was being taken to the hospital with a severely bruised foot after an encounter with a stage weight. There have been four intratroupe marriages and one divorce. Outsiders never hear voices raised in anger, though Pelaez insists it happens: "Thank God, people have disagreements here. My gosh, there are even arguments and high-pitched words."

Pelaez first encountered stage magic at the age of four, watching Fu Manchu—not to be confused with Sax Rohmer's fictitious villain—from the security of his father's lap in a Havana theater. *This* Fu Manchu was David Bamberg, scion of a renowned Dutch family of magicians. Young Cesareo was impressed not only by the show's brilliant illusions and presentation, but also by its rich Chinese decor. A few years later, he formed a theatrical group with his friends: "We got all the mothers to cooperate, all the neighbors." You get the impression that *he* got the cooperation.

As a young man, in the early 1950s, Pelaez attended the University of Havana, hoping to become a lawyer. But when shots rang out one day outside the classroom windows, he decided he'd rather be in school near his home in more sedate Santa Clara. He studied education, later took a postgraduate year in psychology at the University of Kansas ("I thought I knew English. Am I kidding?"), returned home, became disenchanted with Fidel Castro, fled to Colombia in 1960 and arrived in the United States the following year.

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Elaborate masks and costumes, like those of this exotic being, are meticulously handmade by the cast.

In apparent defiance of gravity, David (standing at rear) levitates Marco (under the cloth, top).

He spent the next six years at Brandeis University, near Boston, where he was a disciple of humanistic psychologist Abraham Maslow. Humanism, which contends that among Man's highest needs is self-actualization, remains an important part of his thinking.

In 1969 in New Hampshire, Pelaez founded a "growth center" called Cumbres (the Spanish word for *peak*, as in mountain and experience) to explore human awareness and examine methods of personal growth in a communal setting. Not a place for Aquarian-age dilettantes to grow cabbages and spout psychobabble, Cumbres was designed for pay-as-you-go experience. Trouble was, too few people showed up, and many who did thought they were tapping into just another shrink tank. "We did not want to do therapy," Pelaez reflects. "We wanted healthy people to enrich their lives. The idea was, 'After therapy, what?' But people wanted therapy." He shrugs.

So Cumbres folded within three years. By then, Pelaez had acquired a small permanent following. (Fourteen of the current troupe were at Cumbres, eight as staff members and six as paying clients.) Some of them accompanied him on a 13-country European trip, during which he visited entertainments such as Belgian circuses and Italian puppet shows in search of ways to combine psychology and theater. Magic made the most sense. "We are dealing with illusion," he says now. "It's a basic psychological question: What is illusion and what is reality?"

Keeping magic up his sleeve

In January 1972 he began teaching at Salem State, where he picked up a few more followers. In time, he had everyone around him busily sewing costumes and rehearsing music-hall routines. Remarkably, *they didn't know why*; there wasn't a show yet, let alone a building. Pelaez says he had magic in mind all the time, but if that was in the cards, he wasn't tipping his hand. "We really didn't know what was going to happen," David Bull remembers. "He was urging people to study law, to study lighting, to sew." Says Patricia Byrnes, who performs in the show and works part time in the box office: "When we bought the theater, I didn't even know it was for a magic show."

Today's production borrows heavily from the magical wizards of the past. All the illusions are classics, one from the 20th century (p. 114), the rest from the 19th, with shadows of Harry Blackstone sr., who raised rabbits for his spectaculars and whose vanishing "Enchanted Camel" vanished for good when it died in Boston, and of George Alfred Cooke and John Nevil Maskelyne, whose Egyptian Hall was the magical Mecca of Victorian England. Marco's own recollections are of Chang, a Panamanian whose fast-paced

"Who would sell that extraordinary handwoven Tabriz I just bought at Sotheby's?"

"Late last winter, a long brown roll arrived at the door. Inside were George Washington, Socrates, Julius Caesar, Napoleon and other men of history woven into a most unusual rug.

"A Great Uncle was giving up his country house. Remembering my passion for history, he had chosen to send me his 'leaders of the world' rug. 'No,' he really didn't know any more about it, I found when I called him with thanks. He just thought those historical fellows might interest me, and urged me to sell the rug if I didn't have a place for it.

"Every place I tried putting that rug ruined the room and the rug. Sell it? I didn't know if it was from Pakistan or Persia. Sotheby's Auction Galleries had sold things for friends of mine. They said Sotheby's always seemed to have an expert who knew more about what they owned than they did. Maybe Sotheby's could de-mystify my rug. I called their New York office and was told that if I sent a color photograph or brought in my rug, a Sotheby's expert would tell me something about it.

" 'Something?' Instantly identifying it as a Tabriz from Persia, the Sotheby's expert knew the date, the probable village, and for whom it was woven. I was most intrigued when he pointed out that tiny numbers next to each figure were keyed to the border of the rug. There, in Arabic, each world leader was identified.

"The Sotheby's expert estimated the market value of what I now know to be a Tabriz Oriental. Stressing that an estimate was only that, and the winning bid could be lower or higher, we agreed on a reserve, a minimum price below which my rug would not be sold. I felt comfortable that I had complete and accurate information, and made an educated decision to sell. When my rug appeared in Sotheby's catalogue, I felt a blush of pride. I felt even better when I received a check from Sotheby's. They had earned their 10% selling commission.

"That Tabriz interested me in an Oriental carpet for my living room. I'll subscribe to the catalogues for Sotheby's rug auctions later this year and attend the exhibitions beforehand. With hundreds of rugs to choose from, I know I'll find my floor the carpet it's looking for."

Persian Tabriz rug, circa 1910

"The condominium we bought in a converted mansion dwarfed us and our possessions. We moved in everything we owned, and it looked like we hadn't moved in yet. Where to find the rugs, the furniture, the paintings that would be at home here? Combing antique stores would take forever. My father, who often frequented Sotheby's Auction Galleries, said they had an extensive schedule of art and antique auctions.

"A call to Sotheby's revealed they were having an Oriental rug auction the following week. That Saturday I went to the exhibition that precedes each sale. Oriental rugs are a little mysterious to me, and I was reassured by Sotheby's knowledgeable experts who were on hand to answer my questions and by their comprehensive catalogue. Sotheby's catalogue gives the history, size, condition and estimated value of each rug. I studied the ones that interested me and decided how high I would bid. I even found that if I couldn't get to the auction itself, a Sotheby's representative would do the bidding for me. You specify your limit and they try to win it for you at the lowest possible price.

"Luckily, I was able to attend the auction. It was like going to the theater. I bought a runner and a small Tabriz. The runner was just right for the hall, but in my living room, the 4'7" x 6'8" Tabriz shrank to the size of a prayer rug. Bare living room floors and bare walls stared back at me. Bare walls? Of course, that was where my Tabriz would be perfect. It was!

"Sotheby's is having another Oriental rug sale later this year. I know I'll find my living room floor the carpet it's looking for.

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SOTHEBY'S

show incorporated singing, dancing, acrobatics and frenetic costume changes; of the Peruvian Aldo Izquierdo, who, as Richiardi jr., suspended a girl with her arm resting on an upright broom, much as Marco himself does with David; of Fu Manchu, whose baggy-pants comedian was the prototype for Marco's Monsieur Le Professeur Enrico Besco (played by a college business instructor). The major difference on Cabot Street is that Pelaez forbids the spouting of fake gore, and anyone who disappears must also reappear.

Contemporary magicians cautioned Pelaez that he couldn't do what he had set out to do; magic isn't a flourishing commercial art form in America, where large touring companies have long since been replaced by occasional television specials. Besides, Pelaez was entering the field with no professionals in his troupe (although David Bull *was* in the library, frantically studying magic texts). "I was told I wouldn't last three weeks," Pelaez says, grinning impishly. In truth, the first 90-minute shows were no threat to the legend of Fu Manchu. In fewer than five years, however, Marco turned himself into the toast of the magic kingdom; his show was the feature attraction at the Society of American Magicians' 1981 Boston convention. But the memory of being told that his greatest trick would be to stay in business persists; he does not readily bestow compliments on the brotherhood: "I take my people to see other magicians when I want them to see what I don't want them to do."

What the doomsayers didn't understand was that this enterprise could just as easily have been Marco the Manager's production of "David the Chef and his own Spectacular Seafood Restaurant." Or almost anything else. "My question is not what to do or why," Pelaez says, "it's how." He is not talking about magic; he is talking about life, quality, perfection, *doing things right*. Details of costumes, invisible from even the first row, must be *done right*. Interiors of props, invisible even to some of the performers onstage, must be *done right*. And, most importantly, human relations must be *done right*.

Pelaez has learned to play hardball since his days at Cumbres. Was it an accident that on the very day White Horse Productions was formed—presto!—David Feldman (Tassles the Clown) received his law degree? This is a practical, achievement-oriented bunch. They own both a videotape system and a computer. Immediately after each performance, Pelaez receives a detailed accounting of the show's income to digest with his ginger ale. Whereas he was once quoted as saying the group preferred not to do a TV special because "we just want to be left alone so we can develop and grow," it will now receive a minimum of $35,000 for being filmed for a telecast. Its members disdained becoming a nonprofit corporation in favor of joining the community as full-fledged taxpayers. Communal capitalism—now *that's* magic.

But Pelaez worries. There are moments when he feels he has a bigger problem than coping with the dogs who barked at his bizarre outfit as he rushed outside the theater, from backstage to lobby, during a show. When a news magazine published a story on the Cabot Street phenomenon, he had to get an unlisted phone number—writers, agents and talk-show producers would not leave him alone. Surprisingly, alone is something he very much likes to be.

"It is true," he muses. "If you want me to be incredibly happy, just leave me alone." He sits in the theater's cluttered office, but he is not alone even now. The door opens and closes regularly as staff members come and go on their choreographed rounds. Pelaez has pulled a rabbit out of a hat here in Beverly, but now what does he do with it? "I feel I have to stay." A touch of sadness edges into his voice. "That's my responsibility. And that's my problem, too."

As I raised my arms, the audience of cast members cheered and applauded. And as I stared into the spotlights and acknowledged their response by reaching toward the proscenium arch, I remembered having been seated backstage during a real performance with Daniel Shuman, age seven. And I remembered asking Daniel Shuman if he knew the secrets behind the wondrous tricks we were watching. And I remembered him answering, "Yes, but I promised Marco not to tell anybody." And I decided Daniel Shuman was right to keep his promise. And besides, Marco had made me promise not to tell anybody, either.

Offstage, David and Marco achieve alfresco "Floating Sensation" with reclining Seth Bartlett.

Against a bank of light-bulb fireworks, Marco performs dance of the "Linking Rings"

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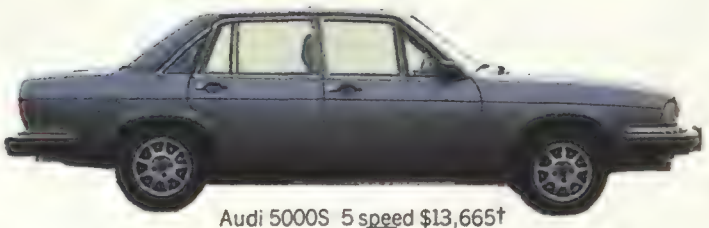

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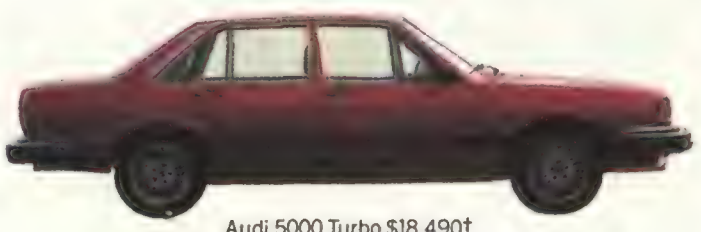

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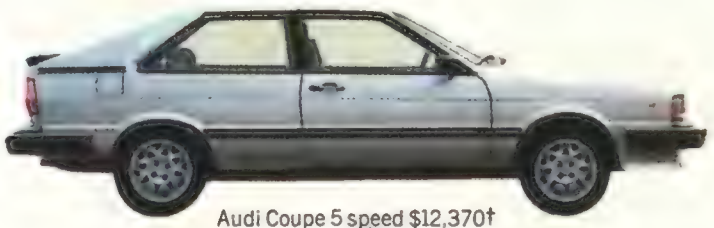

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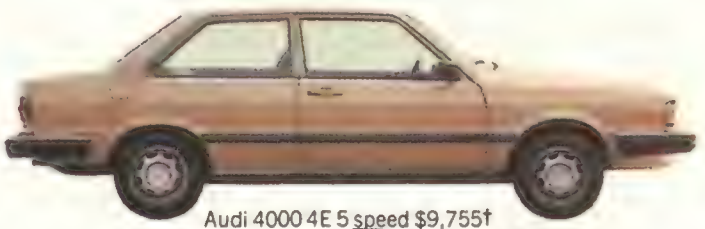

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Audi: the art of engineering.

Restoration revealed B's chiseled features, finely rendered beard. Figure's helmet was not recovered.

By Ann Pearce

Heroic bronzes of fifth century B.C. regain old splendor

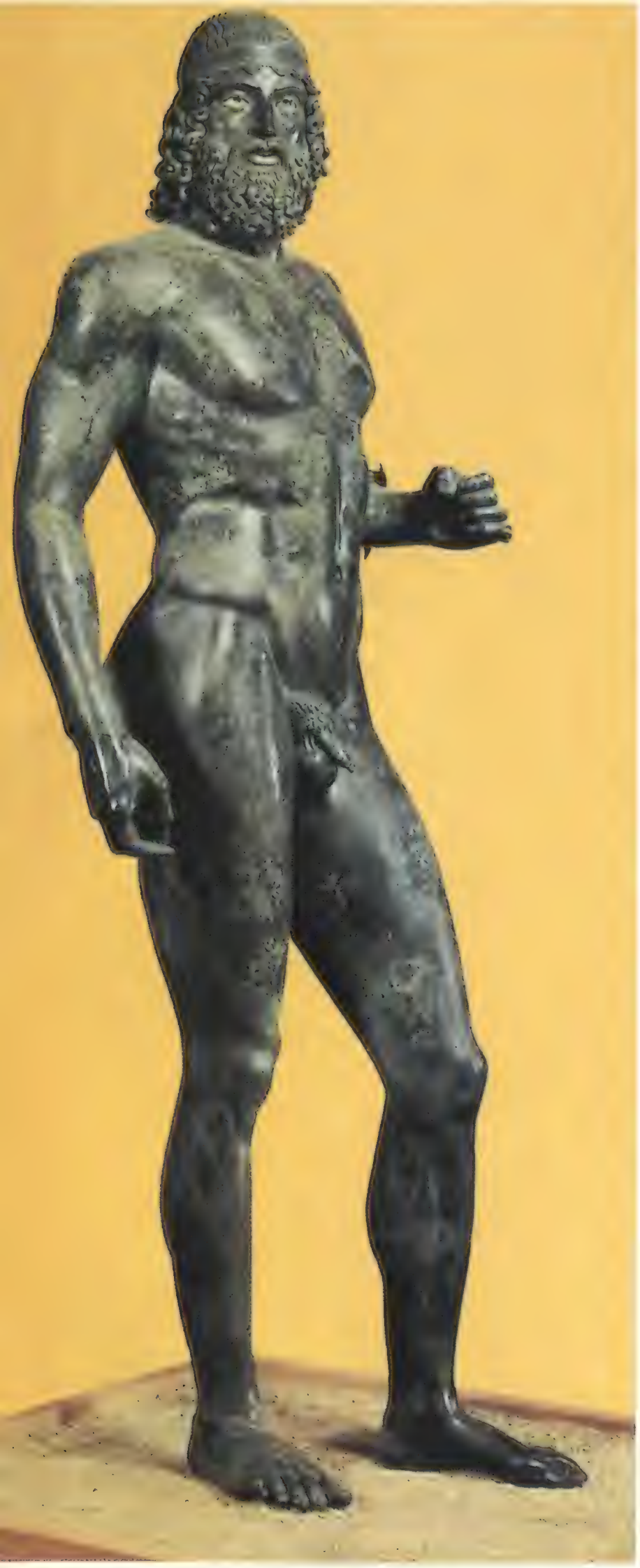
Rare Greek statues, found by Roman snorkler after 2,000 years under the Mediterranean, make Reggio Calabria envy of world's museums

Nine years ago a man with mask, fins and snorkel was swimming at a beach near Riace, a small town on the eastern Calabrian coast. It was the last swim of his vacation, and the next day he had to return to his work as a chemist in Rome.

The beach was almost deserted, just a few family groups and his two cousins watching from the shore. The sun burned through the rubber of his suit as he watched the erratic progress of a small octopus. He fired his harpoon gun and hit the octopus. As he slipped it into a sack hanging from his diving buoy, Stefano Mariottini realized it was his only catch after a whole morning spent scanning the seabed.

He looked at his watch and thought he must soon give up and head back for lunch. Suddenly he froze on the surface of the water. He had caught sight of something black sticking up through the sand about 25 feet down. He dived and went close, then quickly rose to the surface. He had seen the elbow and upper arm of a human figure buried face down in the sand. A

Divers guide Bronze A's dramatic, balloon-aided ascent from seabed. Pottery shard is wedged on hip.



Forcefully striding posture of Young Warrior was indicative of Classic period of fifth century B.C.

long-dead corpse, he guessed, preserved by some chemical reaction, something grotesque and repellent.

Mariottini dived a second time and touched the body. It was metal, not mummified flesh. He felt considerable relief and, as an amateur archaeologist who had worked with university groups, a stirring of excitement. He went down repeatedly, each time pulling away the sand, gradually tracing the outline of a tall figure. He said it felt, as he scraped, that he was creating the statue himself. In a certain sense, he was.

On one swim downward, he inspected the area around the figure. The sea floor was a flat expanse of off-white sand, interspersed occasionally with rocks. Mariottini spotted some dark patches about four feet from his initial discovery. Diving closer, he found that they were the projecting toes and one knee of another statue. This time the figure was lying on its back, covered by only a light veil of sand which he quickly brushed away. Both figures seemed to be nude, made of bronze and more than six feet tall. The first had long thick hair to his shoulders, the second seemed to have worn a helmet. Exultant, but tired from repeated dives, Mariottini brushed the sand back over the two statues, fixed a buoy some distance from the site so he could trace his way there again and left to report his find by phone to Giuseppe Foti, director of the National Museum at Reggio Calabria and Superintendent of Antiquities for the whole region.

A priceless catch

With one desultory fishing expedition, Mariottini had made the Reggio Calabria museum richer in heroic Greek bronzes than any other in the world, proud owner of not one, but two, large Greek statues thought to be mid-5th century B.C. The world possesses perhaps only two other full-sized bronzes from this early Classical period, and they are housed in separate museums: the *Charioteer* who so intently guides his vanished chariot in the museum at Delphi, and *Poseidon* (or *Zeus*) hurling his trident (or thunderbolt) in the National Museum at Athens. That figure, also, was found under water.

When the statues were first recovered, neither their finder nor Superintendent Foti thought they were Greek originals. Their fine details were caked with limey encrustations, their perfect equilibrium and ideal proportions unreadable. At first they were thought to be Roman copies of Greek originals, but as cleaning progressed, Foti and others became convinced that they were the rarest and most precious kind of ancient bronzes, cast in Greece or in a Greek colony of southern Italy in mid-fifth century B.C.

After Mariottini reported his discovery to Foti on August 16th, 1972, the Superintendent ordered a

watch kept on the site by the local customs police. A team of three divers from the Messina branch of the carabinieri reached Riace August 21, equipped with rubber boats and diving gear.

On the first day Statue B, the figure that appeared once to have worn a helmet, was pulled free of sand and its great weight floated to the surface with the help of polyethylene balloons filled with compressed air. The statue was then hauled on board the rubber dinghy and ferried ashore. Recovering the second bronze, usually referred to as Statue A or the Young Warrior, proved more difficult because the figure was more deeply embedded in the sand. Now word had spread and spectators packed the beach six deep, their cars cluttering the only road for a distance of five miles. What should have been an orderly operation took on the air of a Fellini carnival. More than 30 small boats bobbed on the choppy water, roiling the surface, while other enthusiasts with masks peered down into the water—both groups getting in the divers' way and blocking their light.

Turmoil afloat and ashore

As the second warrior was being pulled into the dinghy, rescuers grappling with his waterlogged weight, the boat overturned, sending the figure crashing back to the seabed. But finally he was safely ashore.

The crowd gathered round to stare and discuss the statues' value. Men from Riace told their womenfolk to stay back. So much nudity, although discreetly covered with barnacles, was not a fit sight for women's eyes. When trucks came to take the two bronzes to Reggio Calabria, townspeople got ready to block the road. Some protested the figures were Cosma and Damian, Riace's patron saints, and therefore must stay in the village. Police reinforcements were summoned and the commissioner for the region called on Riace's mayor to cool tempers and guarantee safe exit. All works of art found underground or in territorial waters belong to the state, so the mayor had to comply.

Eventually, Mariottini was awarded one-fourth of the modest $575,000 value that the Italian state placed on the bronzes. After taxes and legal costs his award came to $95,000. This compares poorly with the millions museums in the United States have paid for ancient Greek treasures.

But in 1972 only a few experts knew about the recovery. The statues were still covered with unsightly corrosion and accretions. For two years, supine on foam mattresses, they were cleaned with infinite care in the workshops of the Reggio Calabria museum. Progress was slow. Foti realized that more scientific techniques than those available to him were needed.

Under police escort but without fanfare the bronzes

Gamma rays confirmed this warrior's right arm was replacement; original perhaps was lost in earthquake.

Meticulous removal of limey accumulation (left) from mouth of Statue A revealed well-defined, silver-plated teeth and a carefully groomed moustache and beard (right).

were transferred, in January 1975, to the restoration center of the Florence Archaeological Museum. This center had built up a wide range of equipment and expertise while coping with the aftermath of the 1966 Arno River flood (SMITHSONIAN, February 1974).

The statues were examined under powerful gamma rays to learn more about their internal structure and the thickness of the bronze at key points. It was found that the right arm of Statue B was a replacement. The composition of the bronze is different, the veins and muscles more pronounced and the join clearly visible. Florence restorers theorized that the first arm had been damaged in a violent fall of some kind.

The work of cleaning the bronzes involved many intricate steps and techniques. Where the original surface was flat, concretions could be pried loose with scalpels or bounced from the bronze by pneumatic drills with tiny three-millimeter heads. In the most delicate areas, around the eyes and mouth and in the hair and beard, sonar probes and microsanding devices were used.

These techniques brought about an extraordinary transformation. Warrior B's eye was found under an ugly swelling; pink lips and nipples made of copper emerged. Hair and beard turned out to be finely sculptured with intricate curls. A final refinement was bronze eyelashes applied in one strip, like the false eyelashes of today. Four silver-plated teeth heightened Warrior A's look of challenging superiority.

Two technicians, Renzo Giachetti and Edilberto Formigli, worked on the statues for five years. Despite meticulous removal of all signs of the corrosion known as bronze disease, traces continued to reappear on the surface. The problem was the clay core, which had been encased in molten bronze when the statues were cast. During their 2,000 years on the seabed the sodden cores had absorbed lime and sea salts, an amalgam which now was exuding dangerous chlorides.

The lead tenons, which had once secured the statues to their monument, were removed and the statutes painstakingly emptied through the feet and through existing holes in the heads, using hollow cylinders, hooks and spoonlike scoops, jets of distilled water and concentrated solutions of peroxide. Periodic soaking in baths of solvents loosened the concretions and stopped the corrosive process. Hard-to-reach areas

Still badly encrusted after initial cleaning at Reggio Calabria, Statue B presents doleful visage.

The author, an English journalist living in Rome, was once an underwater archaeologist.

Eye of Warrior B was swollen almost shut (left) before delicate work by technicians uncovered a polychrome eyeball made of limestone, marble, other minerals.

were treated with a chelating agent to inhibit oxidation, then painted with a fixative. Finally, after a year's careful observation in rooms with humidity kept high to assure corrosion was not recurring, the statues were pronounced restored.

In gratitude for its years of patient labor, Superintendent Foti agreed to allow the Florence laboratory to exhibit the bronzes for a month at the Archaeological Museum. The show opened quietly in late 1980, announced by a few modest posters and news items. But the statues' fame spread by word of mouth, and soon long queues formed outside the museum. Art lovers made special journeys to Florence. School trips were organized. Frustrated tourists paraded in the streets, snarling traffic, when the museum did not open on a holiday. The month stretched into six.

President Sandro Pertini had seen the bronzes and decided it would be nice if, on their journey back to the south, they stopped over in Rome. In a last-ditch effort, the Florence Superintendency asked to keep them for another year. At that point Superintendent Foti, thundering, "People can come down here to see them! We're not in the Congo, after all!" threatened to resign if the statues were not back in his museum by July. Minister of Cultural Heritage Oddo Biasini stepped in and soothed Foti, with the result that the bronzes were shown to an admiring daily audience of 18,000 during a two-week stay in the Quirinale Palace in Rome.

Last summer they were installed in a specially prepared humidity-controlled room in the Reggio Calabria museum, but Superintendent Foti was not there to greet them; he had died before their return. Four thousand visitors a day file past them, staring into their eyes, commenting on their beauty, saying "*Bello! Bello!*" and imitating their stance. Before the two warriors arrived, the Reggio museum was lucky to draw that many visitors in a month.

Since June, when the crowds built up so heavily in Florence, Italian papers have been flooded with stories of "*I Bronzi.*" In Camogli, a village near Genoa, a group of women complained publicly of the statues' "flaunting of their sexuality" and hung strategically wrapped replicas in the town square.

Among archaeologists, the debate has just begun, and awaits next year's publication of the conclusions of Foti and the Florence restorers. Three important questions remain: the statues' identity, who made them, and how they came to be in the sea off Riace.

Later, in Florence lab, jets of peroxide flush salts and dissolved casting core from bronze's orifices.

Despite scrofulous appearance, these calcareous accretions actually protected B's back underwater.

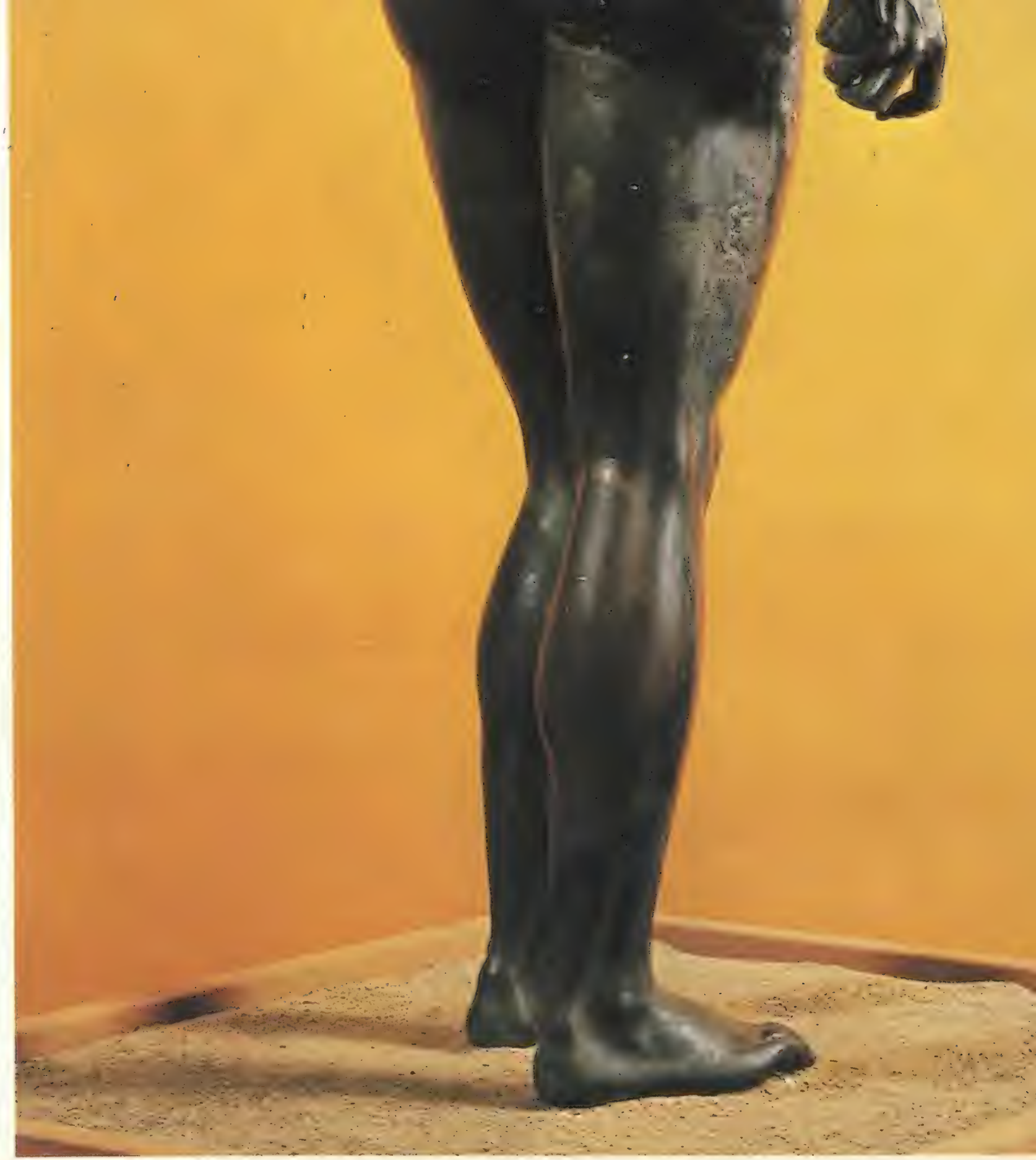
At first it was believed that the two warriors could have been part of the offering made by Athenians to the sanctuary at Delphi after their victory at the Battle of Marathon in 490 B.C. Pausanias described the monuments as being decorated with figures of gods and heroes by Phidias. Restorer Formigli went to Delphi with casts of the lead tenons and tracings of positions of the feet, but did not find a plinth to fit. Laboratory Director Pier Roberto Del Francia admitted gloomily that the search was comparable to looking for Atlantis. Other experts suggested that the young warrior represented fiery Achilles when he went to avenge his friend Patroclus outside Troy. The more sober warrior could represent Hector after his fight with Patroclus, awaiting the vengeance of Achilles. Or they could be other heroes and warriors.

Great names have been posited as their maker. Phidias, who carved the Parthenon reliefs, and such famous sculptors in bronze as Polykleitos, Myron, Onatas and Kalamis have been proposed. A likely candidate is Pythagoras of Rhegion (Reggio), about whom Pliny wrote. He was active in the fifth century B.C. and famous for his treatment of veins and hair. These are certainly handled masterfully in the two bronzes, but experts have no similar work of Pythagoras for comparison.

How they came to be in the sand at Riace is also a mystery. The most obvious explanation, favored at the moment by the Superintendency, is that they were either jettisoned during a storm or dislodged from the deck of a ship carrying stolen Greek treasures to Rome, perhaps as early as the first century B.C.

In 1973, an underwater expedition searched for the remains of a ship. Little was found, only 27 lead sail rings and a small, incised shield handle that fitted the hand of the Young Warrior and was undoubtedly attached to the rim of his missing shield. The absence of pottery seemed to disprove the theory that a ship sank with the warriors. And yet a conflicting piece of evidence has come to light recently. In one of a series of newly released photographs showing Statue A rising to the surface, a large piece of an amphora is clearly visible, wedged between his right arm and hip (p. 125). During the rescue operation when the warrior tumbled back into the sea, the piece became dislodged and has never been recovered. Lately, the Italian press has been rife with rumors that the missing shields and helmet were recovered by fishermen and divers early in 1972, months before Mariottini's discovery, and spirited away by such disparate figures as an archaeologist from the north of Italy, a local Mafioso, and an American museum.

There are plans for an extensive exploration of the area in 1982. Then perhaps the presence of a ship and the provenance of the statues may be established.



Supple contours and soft patina visible once more, Young Warrior stands ready to greet throngs of visitors.

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By Timothy S. Green

Stalking the world of nature with BBC's superguide

David Attenborough dramatizes evolution with a bounding enthusiasm and a unique cast in his TV series Life on Earth, *coming soon*

Crouched before a coiled diamondback rattler, a wary Attenborough describes to viewers its sensory organs.

Four programs in the history of British BBC television have stood out among all comers in winning the highest levels of audience appreciation: the coronation of Queen Elizabeth II; the first moon landing by the Apollo 11 astronauts; a BBC 13-part natural history series, *Life on Earth*; and, resoundingly, the recent wedding of Prince Charles and Lady Diana Spencer.

The distinction of TV ratings shared with royalty and space travelers goes to a tall, slim Englishman with boyish good looks and wavy, sandy hair named David Attenborough. He wrote and narrated *Life on Earth*, which Americans will be able to judge for themselves starting next January 12, when the first program, "The Infinite Variety," makes its debut on PBS, courtesy of the Mobil Corporation. By way of preview, the U.S. book version of the series has just been published by Little, Brown & Company.

In England, the reaction to *Life on Earth* was startling. An enthralled ten-year-old sent a note to the BBC pleading, "I'm frightened of it ending each week, so it would be a good idea if five minutes before the end a warning could be flashed on the screen, so that I can be ready and not be so disappointed." To which *The Observer*'s Clive James, often the most caustic of TV critics, added, "There can't be the smallest doubt that this series will recruit thousands of new students for the life sciences."

To those who know David Attenborough, the success of *Life on Earth* is no surprise. For almost a generation, he has been something of a British institution. Clad in shorts and hiking boots, he has trekked through jungles and waded across swamps in search of orangutans, birds of paradise or a spectacular Malayan lizard known as the Komodo dragon. His infectious enthusiasm—on a series of 48 programs called *Zoo Quest*—for every kind of animal he found appealed to armchair travelers who felt that here was a real explorer taking them along and sharing wildlife secrets, gamely brushing discomfort aside. On another show he appeared entirely at ease in the depths of some Borneo caves with giant cockroaches crawling up his legs and bats freewheeling through his hair.

In the face of danger, Attenborough always displayed aplomb. Marching over a mountain pass in New Guinea, his party was confronted by a horde of warriors brandishing spears and axes. The porters

yelled "Cannibals!" and fled, but Attenborough stepped forward smiling, with his right hand outstretched in greeting, and said "Good afternoon." To which the attackers courteously responded "Good afternoon," as they lowered their weapons (the cameramen, equally cool, filmed the whole thing). It transpired that the warriors were traditional enemies of the porters' tribe, and whenever they met they staged this type of warlike demonstration.

Today, Attenborough, now in his mid-fifties, has lost none of that sense of excitement that he can convey when confronted with a fresh wonder of nature, which is why *Life on Earth*, the most ambitious natural history series ever made, is such a hit. A history of nature, it tells the story of evolution from the first primeval slime on the face of the Earth, 3.5 billion years ago, to the advent of Homo sapiens, unfolding a panorama of the natural world that ranks in scope with such BBC epics as Kenneth Clark's *Civilisation* and the late Jacob Bronowski's *The Ascent of Man*.

The essential difference is that while Lord Clark is a distinguished art historian and Bronowski was a renowned scientist, David Attenborough, although he holds degrees in zoology, geology and anthropology, is by profession a broadcaster. Virtually all his career has been spent as a producer, narrator and administrator for the BBC. Yet he has a rare talent for describing with great simplicity the complexities of evolution. He never underrates the intelligence of his audience. "Every episode has a sophisticated line of zoological thought," he told me, when I visited him at his home close to Richmond Park on the outskirts of London, "but audiences in this country actually like someone to say, 'This may be difficult in bits, but we're not going to cut corners; stick with us and we'll go from letter A to letter Z.' "

Wildlife with Father: learning to explain

His respect for the viewers undoubtedly stems from his childhood. "My father, who was principal of University College, Leicester, was a marvelous educator, a great teacher," he explains, pacing up and down the book-lined study that occupies almost half the upper floor of his house. "And he believed that the way you teach children is to allow them to discover for themselves. You don't tell them they are ignorant and that the fount of all knowledge is their parents. From the age of six, I was always roaming the countryside in search of fossils or wild animals. I'd find a fossil and show it to my father and he'd say 'Good, good, tell me all about it.' So I responded and became my own expert. After a while I got a tank of tropical fish, and then I'd explain to him how they bred."

As the family home filled up with assorted rocks, fish, newts and grass snakes, David's elder brother, Richard, was not always amused. Richard had set his own sights on an acting career and his brother's passion for bugs was beyond understanding. "I could never pig it the way David does," Richard Attenborough, the noted motion-picture actor and director, once admitted. "All that wading up to the hips in mud and living on roots. No, thank you."

But David never wavered. He pursued his love of fossils by earning a geology degree at Cambridge University and ended up in 1952 as a trainee producer with the BBC's infant Television Service, turning his hand to everything from prime ministerial broadcasts by Winston Churchill to ballet. Natural history programs usually consisted of a man from the London Zoo bringing a few animals along to the studio (where

Horseshoe crabs, the sole living kin of extinct trilobites, seek a beach for an old fertilization rite.

Giant spider crab, awkward when on land, demonstrates its tool-like limbs to Attenborough.

a doormat was strategically placed in case of accidents while he displayed a chimp or a mongoose before the cameras). And there were wildlife films from Africa.

Attenborough felt that a new dimension was needed for the natural history material. "My idea," he relates, "was to combine the benefits of the two: to see an animal in the wild and then bring it back live to show in the studio." Thus *Zoo Quest* was born. He took off for Sierra Leone in search of an obscure bird known as the bald-headed rock crow (*Picathartes gymnocephalus*) on an expedition that became the turning point of his life.

The origins of *Life on Earth* certainly stem from that first exposure to the tropics. "I still recall," he writes in the introduction to the book *Life on Earth*, "the shock of stepping out of the plane and into the muggy, perfumed air of West Africa . . . wherever I looked, I found a prodigality of pattern and colour for which I was quite unprepared. It was a revelation of the splendor and fecundity of the natural world from which I have never recovered."

Strictly speaking, Attenborough went to Africa as a producer, but the man who should have narrated the program was taken ill. Attenborough took his place before the cameras. He was an instant hit. He still loves to recall how, shortly after the first show on the rock crow was telecast, he was zipping round the Marble Arch in an open sports car when a Cockney

London-based Timothy Green writes about Britain and beyond. In May 1981, SMITHSONIAN *adapted portions of his new book,* The World of Diamonds.

A forbidding fish, the "living fossil" coelacanth makes its underwater film debut in *Life on Earth*.

bus conductor spied him and yelled, "Hello, David, how's *Picathartes gymnocephalus*, then?"

He might well have stayed with wildlife programs but for the introduction of a second TV channel by the BBC in the mid-1960s. He was asked if he would stop globe-trotting to become controller of the new network. "It was a blissful time," he says, wistfully. "I had no audience and no policy, so whatever I did was an improvement, and this was to be Europe's first all-color channel. So we decided, 'Let's put on a series showing all the loveliest things of this civilization over the last 2,000 years, and do it in the historical sense so that civilization is crystallized.' " The result was *Civilisation*, the success of which opened the floodgates. "Every department head in the BBC came rushing to me," Attenborough remembers cheerfully, "saying, 'Please, sir, please, sir, can I have a million quid to make the next series?' " Meantime, the BBC's Natural History Unit was eager to create an epic on the animal kingdom. "The natural history idea was in the air and I got the jimjams," he admits. "I was on hot bricks in case someone did it before me. So I decided I must get out." As soon as he could gracefully vacate his administrator's chair, he resigned to become a freelance program creator.

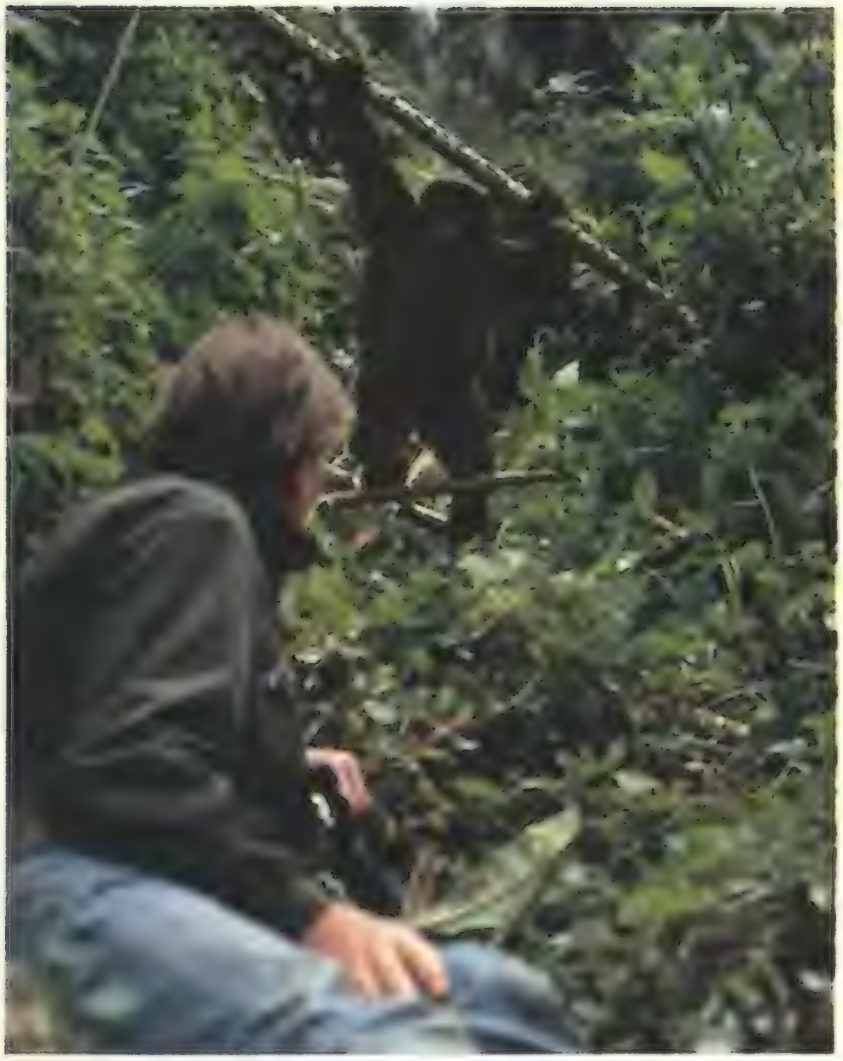
Circumstances were not quite ripe for the nature epic, so Attenborough turned his attention to a topic that had long intrigued him: the art of primitive tribes. He promptly embarked upon a world tour to make a series called *The Tribal Eye* (seen by American viewers on PBS in 1975). "I was interested in the function of art in tribal societies," he explains. "Sculpture, painting, weaving, carving all have natural functions, but to understand their messages fully we have to know something about the artists who produced them, the society to which they belonged and the purposes for which they made them." Searching for clues, he went to see the weaving of the nomadic tribes of Iran, the cult houses of Melanesia, the bronze making of Benin and the Dogon wood-carvers living in Mali. He was disturbed by what he found.

He walks across his study to pick up a two-foot-high Dogon carving of a seated couple, their arms gracefully intertwined behind their backs. "This is a primordial couple," he says, "the ancestral male and female beings of the tribe, as powerful to them as the Nativity is to us. It has a brooding presence. And you see how the carver had flattened the torso like the flank of a deer or an antelope. This gives it an otherworldly power." But what he discovered on his odyssey was that the significance of such tribal symbolism was missed by outsiders and that once a tribe came into contact with the Western world, the style of the sculpture often changed. "Sculpture is a language with a very precise meaning," he argues, "so what you soon get is 'airport art.' It's equal to pidgin English, which is used to convey very simple things. Airport art is exactly the same: 'I come from Africa, I am an elephant.' But it is produced by one people for the benefit of another." The danger, he believes, is that art then loses its original role in the tribe.

From life's origins to Man in six pages

While he was completing *The Tribal Eye*, the Natural History Unit finally made a successful pitch to start what would become its "animal blockbuster." The opportunity he was longing for had finally arrived. Several conferences later, he sat down in his trophy-cluttered study and typed out just six pages on what *Life on Earth* should embrace. It was to be a visual encyclopedia of nature, beginning with the most primitive organisms in the sea, leading to the development of fish and other marine life, then tracing the gradual emergence on land of plants and amphibians, onward to the conquest of the air by insects and birds, and finally recounting the arrival of warm-blooded mammals and Man. Each episode was to focus on a basic theme.

"You can really only say three or four fundamental things in a one-hour program," Attenborough points out, "so, if it is devoted to amphibians, what you want to say is that they represent the intermediate stage between fish and land beings, but that they were faced with a couple of crucial problems. What to do about their wet skins? An amphibian can shrivel in hot sun because its skin is not watertight. And what do they



Rwanda gorillas welcomed Attenborough warmly. Here, a youngster may be sizing him up as playmate.

Four-inch-long pygmy marmoset, smallest of all true monkeys, is pictured in the *Life on Earth* book.

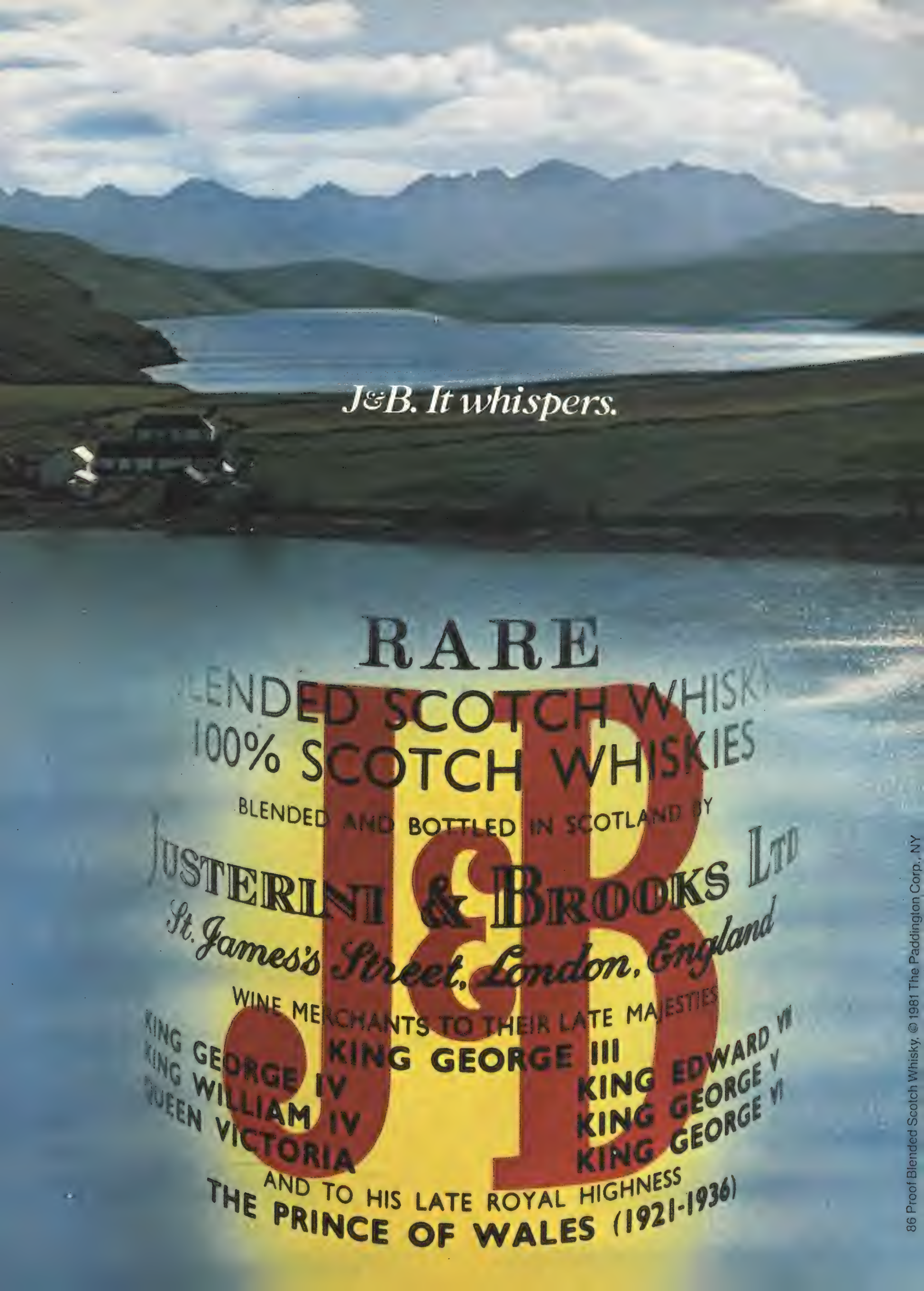
do about babies, which have always developed in water? Then you have to find two or three characters whom you really care about and show how, in due course, they got final solutions—watertight skins and shelled eggs—to those problems."

Since the time scale of 3.5 billion years is difficult to conceive, Attenborough lets one day represent ten million years, condensing the entire period into a single calendar year. Life begins in January; the first fossils of algalike organisms do not appear until early May; the oldest marine worms are not evident before November; the move from sea to land takes place in mid-December; and Man himself is a real newcomer —he takes the stage only on New Year's Eve.

Attenborough tells his story, as far as possible, in terms of plants and animals that are either survivors of, or make appropriate stand-ins for, the ancient protagonists. "The lungfish today shows how lungs may have developed," he suggests. "The mouse deer represents the first hoofed animals that browsed in the forests 50 million years ago." He admits that although a living species of today may share some essential characteristics with its ancestors, it will almost certainly differ, too. But using a modern cast, as it were, offered the opportunity for a unique spectacle.

The task of transforming Attenborough's concept into 13 55-minute installments was shouldered by the Natural History Unit, backed by coproduction funds from Warner Brothers in the United States and Reiner Moritz Productions, a German TV company. The budget was more than $2.5 million. Three producers—Chris Parsons, Richard Brock and John Sparks—were fielded and 20 of the world's finest wildlife and science cameramen were put under contract. Aided by research from more than 500 academic organizations (including the Smithsonian Institution), they identified in excess of 100 locations in 49 countries where fossil beds, rare plants, exotic marine life, or little-known insects, birds or mammals might help tell the story.

The enthusiasm generated along the way was remarkable. At the Smithsonian, Chris Parsons mentioned that he was trying to locate a man named Carl Shuster, who had done definitive work on horseshoe crabs, distant relatives of the trilobites, sea creatures that were the first to develop high-definition eyes. He learned that Shuster actually then worked for the Federal Power Commission in Washington, D.C. When Parsons called on him to ask how they might photograph these offshore dwellers, Shuster cleared his desk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in delight, pulled out tide tables and started calculating. "On the nights of the second and third of June," he soon announced, "they will come up out of the sea about dusk on the sandy beach of Delaware Bay to deposit and fertilize their eggs." Sure enough, on June 2, as an alerted Attenborough prowled the beach with a hurricane lantern in his hand, the horseshoe crabs scuttled up out of the waves—right on cue—to provide one of the most spectacular sequences in the series (p. 136). "They came out in a solid mass," he recalls, "like huge cobblestones forming a causeway along the beach. And what is amazing is they've been doing that for 200 million years."

Natural history amateurs cooperated as readily as professionals. Desperate to find, beyond static museum displays, a good fossilized skull of a three-horned dinosaur known as *Triceratops*, producer John Sparks was sent to "weekend paleontologist" Don Beckman, who was with the U.S. Army Corps of Engineers at Fort Peck Dam in the badlands of Montana. "Don't worry," smiled Beckman, "we'll find you one." Within weeks he had located one of the best specimens ever found sticking out of a Montana butte. The setting was perfect for Attenborough's explanation of how such dinosaurs, chewing their way through the vegetation of North America 65 million years ago (or December 25 in his telescoped year), grew to the size of a large rhinoceros and a weight of nine tons; but how, also, they might have been finally done in—according to one theory—by falling body temperature when the climate changed.

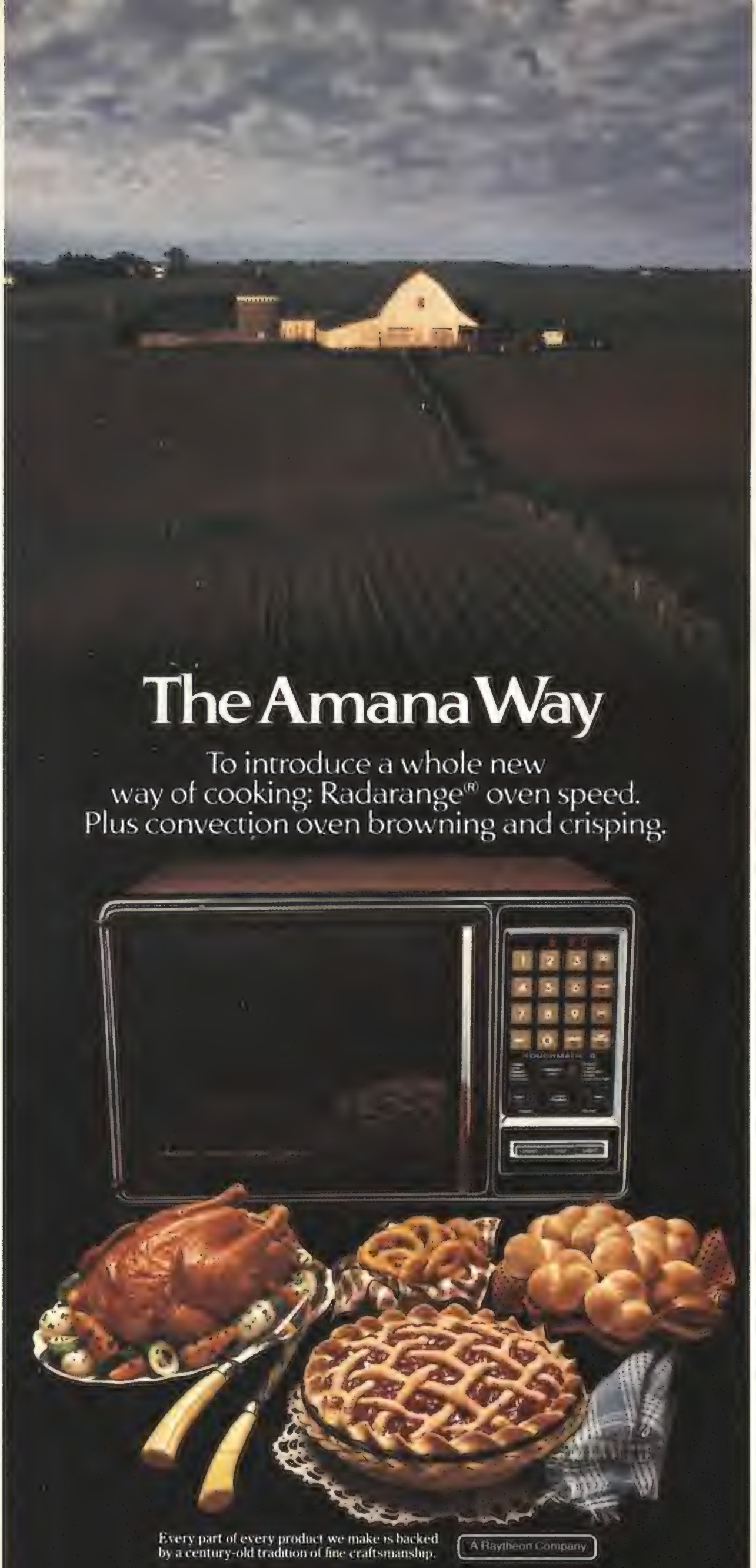
Out of the mouth comes babe

Cameramen found that they were expected to record events in the natural world that had often been described only in scientific papers and never before filmed. Attenborough was eager to demonstrate, for example, one of the problems facing the first amphibians: breeding on land. How were eggs, which had always been laid in water, to be prevented from drying out? And how could tadpolelike creatures develop except in water? A bizarre solution appears in *Rhinoderma darwini*, a tiny frog first discovered in southern Chile by Charles Darwin. The female lays her eggs on moist ground, but once they begin to develop, the males, who guard them, appear to eat the eggs, actually hiding them in their large vocal sacs. There the eggs develop until one day a male gapes—and out of his mouth pops a fully formed froglet. But no one was certain precisely how long the gestation period lasted. So cameraman Rodger Jackman sat down before a *Rhinoderma darwini* male known to be "expecting," and, nudged by friends, stayed awake for 140 hours, after which the frog gaped awkwardly, a bleary Jackman turned on his cameras—and out jumped a froglet!

Other lensmen secured several "firsts," including a crocodile mother ferrying her young across a river, cradling them gently between her jaws; and the hunting forays of an American fishing bat (*Noctilio*) that skims low over lakes, trailing its feet in the water to catch fish with its hooked-shaped toes. They filmed, too, the pollination of the Central American yucca, a feat performed solely by a small moth with a specially curved proboscis with which it gathers pollen from the stamens of the flowers and then, having molded the pollen into a ball, transports it to another yucca flower, where, in the process of laying its own eggs, it deposits the pollen ball.

The cinematographers were not always precisely sure of what they were looking for. Trying to capture the moment when the pink and hairless neonates, or young, of a mouselike Australian marsupial called the kowari are born and struggle, unaided, from the mother's vent to latch onto the teats of her pouch, took a team of two more than 400 hours of filming. Even then they feared they had missed the moment. "Finally," recalls John Sparks, "we went through their film, frame by frame, and discovered we had it after

Unlike tree-climbing mainland iguanas, one species on Galápagos clings to rocks and feeds on seaweed.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all—the neonates scoot up inside an archway of the mother's fur in one-and-a-half seconds."

The most elusive target was the coelacanth, a fish presumed until 1938 to have been extinct for more than 70 million years. Although, since then, many specimens of this fish have been recovered, it had never been filmed swimming in the sea. Cameraman Peter Scoones set out for the Comoro Islands in the Indian Ocean, between the Malagasy Republic and Mozambique. Night after night he trailed highly sensitive electronic cameras along the seabed in areas where local fishermen had caught coelacanths. Not a single one turned up. On his final day, word arrived that a fisherman had come in with one of those "living fossils" strapped to his boat. Scoones rushed over and persuaded him to release the fish in the bay so that he could film it underwater for the first time (p.137).

While the producers and cameramen hunted, Attenborough girdled the globe like a latter-day Charles Darwin. His travels began, appropriately, in the Galápagos Islands, where subtle variations in lizards, tortoises and birds from those encountered on the mainland of South America had strengthened Darwin's growing suspicions that species were not fixed forever. But in *Life on Earth*, Attenborough, while briefly outlining Darwin's theory of natural selection, has kept clear of the controversies about the mechanisms by which evolution takes place. "What I've tried to do," he says, "is to say, 'Here's what happened. You can see from the fossilized remains in these rocks how one creature begat another.' "

So he proceeds. He's off down the Grand Canyon on muleback, tracing the fossil record of animal life back to worm tracks in rocks 550 million years old. He strides the windy shores of Lake Superior where tiny fossil cells in rocks two billion years old reveal the earliest secrets of primitive life. He gasps in the drifting volcanic vapors of the thermal areas of Yellowstone, where conditions similar to those in which early photosynthesizing bacteria lived can be found today.

Nothing fazes him. When Dian Fossey takes him out to visit the family of mountain gorillas that she has been studying on the slopes of Mt. Karisoke in Rwanda, they welcome him grandly. He is virtually smothered in a flurry of bodies as the young gorillas treat him as a playmate when he sits down on the ground. Undeterred, Attenborough keeps up his commentary on the gorillas' resemblance to humans from a tangle of hairy arms: "Their sight and sense of hearing and smell are so similar to our own that they perceive the world in much the same way we do."

Never at a loss for some simple explanation that will make the most complex notion comprehensible to a ten-year-old, Attenborough fits perfectly into his own definition of Man in the final episode of *Life on Earth*, "Humankind—The Compulsive Communicators." His theme is that the process of natural selection has fostered in us a supreme talent for communication: "Man's passion to communicate and to receive communications seems as central to his success as a species as the fin to the fish or the feather to the birds."

He is concerned, however, about mankind's facing up to its responsibilities. "No species has ever had such a wholesale control over everything on Earth, living or dead, as we now have," he argues, in winding up *Life on Earth*. "That lays upon us, whether we like it or not, an awesome responsibility." A trustee of the World Wildlife Fund, he is equally proud to be a vice chairman of the London-based Population Services for Birth Control. "I believe the most crucial part is Man limiting his own numbers," he states forcibly. "If we could get those down, our demands on the natural world would be minimized."

Yet his approach to conservation is a realistic one: "I'm for preserving wild animals and the countryside, but not at the expense of housing the homeless." (Speaking of housing, his next BBC series will examine different ecosystems, including cities. Called *Planet Earth*, it should bring rain forests, tundra, *et al.*, into our living rooms sometime in the mid-1980s.)

Attenborough is wary about ardent causes or "campaigns." "What upsets me about campaigning," he confides with the sensitivity of a lifelong broadcaster, "is that all the time it's verging on propaganda. If you are not careful, you go to extremes. You get people who say, 'If I had to choose between my son and the gorilla dying, I'd save the gorilla.' That's potty."

Red uakari monkey's keen eyes and color perception let it, claims Attenborough, judge ripeness of food.

The Great Domesday Book was a medieval data bank. All the facts were there, but there was only one copy.

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The room in 1974: bulletproof glass seals off galleries, garish damask covers wall above arches.

By William Seale

Glowing revival for 'most beautiful room in America'

New York's Senate Chamber, a masterpiece by H. H. Richardson, is proof of what a very meticulous restoration can achieve

When first occupied in 1881, the Senate Chamber in the New York state capitol was proclaimed "the most beautiful room in America." It glittered like a piece of Byzantine jewelry within the unfinished stone labyrinth that was the mightiest house of government yet conceived by one of the states. Some 17 years later, the capitol itself was brought to an uneventful completion, by then out of style and modified—indeed humbled—beyond what the succession of its designers over nearly 40 years would likely have recognized. The Sen-

Fully restored, this is how the great red and gold chamber looks today. Richardson used exotic

materials. Original wallcovering above arcade was brass-leafed embossed leather. Richardson paid for gold but got brass; he apparently never knew. Reproduction is in polyester with genuine gold leaf.

The austere Senate Lobby, with Gothic vaulting, is work of Richardson's colleague, Leopold Eidlitz.

ate Chamber was one of the few parts of the building to which the state could point with pride.

But with time the chamber rapidly dimmed under layers of dust, losing its golden gaslight glow to the tawdry glare of electric light, and its churchlike peace to jingling telephones and a constant rumble of voices. By the 1970s there were nearly twice as many senators as the room had been designed to house. It had been clear for years that the old chamber was obsolete, its walls and ceiling dingy and grime-covered, its steep galleries rising behind thick, bulletproof glass, its stained-glass windows filtering the strong south sunlight onto many unsympathetic alterations.

This year the Senate celebrated the chamber's first century of occupancy. The look of the place had wholly changed. The room that was once America's most beautiful had been brought to life again, making it one of the finest early products of the new Age of Preservation—the era of recycled architecture. Again shimmering with light from a thousand varied surfaces, the chamber was suddenly a place no one felt he had ever known before. It is also a highly personal room, bearing the timeless stamp of the master architect who was its creator.

Henry Hobson Richardson did not design the New York capitol, but was one of a three-man team brought in to advise on the project, which was well under way, but which the legislators felt had got out of hand.

A reform administration had come into power in New York in the election of 1875, with the feisty enemy of the Tweed Ring, Samuel J. Tilden, as governor. Tilden's commitment was to sweeping out the dark corners of evildoing in New York government.

Whether the capitol was in fact corrupt as a project, it looked as though it must be. In construction eight years, it was already at least a million dollars over the original estimate of its cost, and it was so unfinished as to be wholly useless. Tilden appointed a new capitol commission, naming as its chairman William Dorsheimer, his lieutenant governor. It was this commission that summoned the team of three consultants, which included, besides Richardson, the landscape designer and critic Frederick Law Olmsted and the architect Leopold Eidlitz of New York City.

The original architect of the capitol was the English-born Thomas Fuller, designer of the much-admired center block of the Houses of Parliament in Ottawa. That immense Gothic Revival pile had been recommendation enough for him as architect of the capitol of the Empire State. In Albany he abandoned the Gothic style that had made him famous and took up the Second Empire style, epitome of the Gilded Age.

But when Richardson and his colleagues walked through the capitol in the winter of 1876, patches of snow stood in the unsheltered areas. The Senate Chamber, on the third floor, was unroofed.

The consultants convinced the commission that they could rescue the project if it were turned over to them. Commission chairman Dorsheimer was not only an old friend of Richardson, having known him since Harvard days in the 1850s, but also a devoted admirer of Richardson's architecture.

Richardson was the most interesting architect in the United States of the 1870s. He stood somewhat apart from the Gilded Age in which he lived. His deep regard for materials and principles of construction were in some cases the antithesis of an era of paint and gilt, iron-front buildings and the stucco that masked myriad shortcuts in a structural skeleton.

The last word on his designs was always withheld

William Seale, a historian, wrote The Tasteful Interlude *and, with Henry-Russell Hitchcock,* Temples of Democracy, *about U.S. state capitols.*

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Detail of Knoxville marble grotesque is typical of the high quality of stonecarving in the chamber.

Beside a Richardson clock is original chair the architect designed for William Dorsheimer.

until the building was under way, when Richardson could sense it as a material reality. "The architect acts on his building," he often explained, "but his building reacts on him—helps to build itself." He remained intimately involved in polishing his designs even as his buildings rose, concerning himself with every stone, every nuance of color.

Without hesitation, Dorsheimer arranged for the dismissal of Fuller and the appointment of the three-man team as architects of the capitol. On the exterior, the three were to perform together; on the interior, the responsibility was divided between the two architects, with Olmsted, who was more widely known than the other two, as adviser and critic. To Richardson went the Senate Chamber.

Richardson's first concern was that the ceiling seemed too low for the length of the room. This he solved by lopping off each end of the long rectangle, leaving the central area, where the senators were to sit, nearly cubical in shape. The two "removed" ends he further reduced by cutting them horizontally into two levels, with the lower sections used as lobbies, walled away behind the high-backed settees of the chamber, while the upper sections he made into lofty spectators' galleries, open to the chamber but fronted by heroic arcades of Siena marble and Scottish granite. Thus the volume of the room was reduced, and the clumsy form reshaped to a more intimate scale, with dramatic visual interest. From that point, Richardson's work was largely one of ornamentation and decoration.

A big chair for a big man

No detail was too small for his personal attention. He selected the various materials, and always had final approval of what the craftsmen produced. When it came time to design the furniture, Richardson sketched dignified chairs which he had executed in mahogany and red leather. For Dorsheimer, as President of the Senate, he fashioned a matching version of the same chair, but since it had to accommodate a huge man, it made the senators' chairs look like doll furniture (left).

In architectural projects, the end results are not always as the planners planned. This was true, of course, of Thomas Fuller's original project. And it became true of Richardson's work on the capitol. In 1883, with the coming of Governor Grover Cleveland, an earnest reformer and cost-cutter, the commission, Richardson, Olmsted and Eidlitz were replaced by a single man, Isaac G. Perry.

The Senate Chamber was never quite finished, but it came close to being so. Especially in the area of stonecarving had the work fallen short. The overmantels of the huge fireplaces were but smooth blocks;

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panels over the doorways were left blank; and in the delicate etching of the great arcades over the galleries, the garlands were abandoned half-finished. Enough had been spent, however, and no more money was forthcoming. The Senate Chamber was frozen in a state of near completion.

For all the changes, the great room was not dramatically altered over the years, just debased. The great gasoliers were replaced by chandeliers in the so-called Art Deco taste of the Thirties. Richardson's chairs were long since tossed to the winds. Crisscrossed by paths of wearing, the Persian-style carpeting Richardson had designed in 1880 was supplanted early. High above it, the great oak beams of the ceiling were obscured by grime. A boldly patterned damask covered the large upper wall areas. And of course there were the fierce-looking protective barriers of bulletproof glass, installed there, and in many capitols in this country, during the unrest of the 1960s and early '70s.

"By 1976," says Roger Thompson, Secretary of the Senate, "something had to be done about the chamber." Norman S. Rice, the scholarly director of the venerable Albany Institute of History and Art, persuaded Thompson of the historical importance of the chamber, and urged not a remodeling but a *restoration*. Thompson brought the idea to the leadership of the Senate, and a small bipartisan working committee was set up. The members were Warren M. Anderson, majority leader; Manfred Ohrenstein, minority leader; and Thompson. In addition to the committee, there was an advisory board with Matthew Bender IV of Albany as its chairman.

Architect John I. Mesick of Albany was engaged in January of 1978 to prepare a scheme for restoring the Senate Chamber. In April the leadership approved the plans, but as it happened, it was mid-July before the workmen could enter the chamber and build their scaffolding. When the work did begin, it went on for five months without interruption.

The transformation brought about by the washing of the walls and ceiling was one from black and white to Technicolor. After this was finished, the restoration of lost elements was begun. The original embossed leather wallcovering on the upper walls was reproduced in reinforced polyester and covered with gold leaf; the stained glass was repaired and releaded where necessary; and, last, the intricately patterned carpeting was reproduced, capturing in its coloration all the varied shades in the room.

Richardson held light, like everything else in his interiors, firmly in his control. The artificial light for which Richardson designed in the 1870s and '80s was fueled not by electricity but by gas. While the great brass chandeliers and sconces have been reproduced in every particular and float once again, like huge carousels laden with balloons, over the heads of people in the room, they use brilliant electric bulbs. Only when dimmed to the lowest possible level can the chamber be appreciated in the light Richardson intended. It has been compared to the great Byzantine church of Hagia Sophia in Istanbul, as rebuilt in the sixth century A.D. The same play of light in a goldish space is the "Byzantine" effect Richardson achieved.

The overdoor panels of stone that had never been finished were carved at last. The work was done by Vince Leggiadro, stonecarver, from designs and models prepared by Carlo Parducci, adapted from an original sketch by Richardson. Everyone agrees the decorative stone garlands outlining the arches should be left as they are, showing the phases through which a piece of stone passes in the course of becoming carved. Historians debate whether it would be a mistake to carve today the great blank faces of the fireplace overmantels, although Richardson intended that they be carved, and left drawings for them.

There is no contest, however, over the merit of the Senate Chamber's restoration. Its success has led directly to an ambitious program of restoration for the entire capitol building, which it is hoped may be carried out in the 1980s. Restorations of state capitols or parts of state capitols are being conducted today in almost every state. The difference between most of them and the Senate Chamber in Albany is that New York's chamber is in its sum total a work of art, apart from its role in the history of the state. In this great room, bright again today, we can see the genius of Richardson's "personal architecture" at its best.

New Senate gates were designed and forged by noted metalsmith Albert Paley of Rochester, New York.

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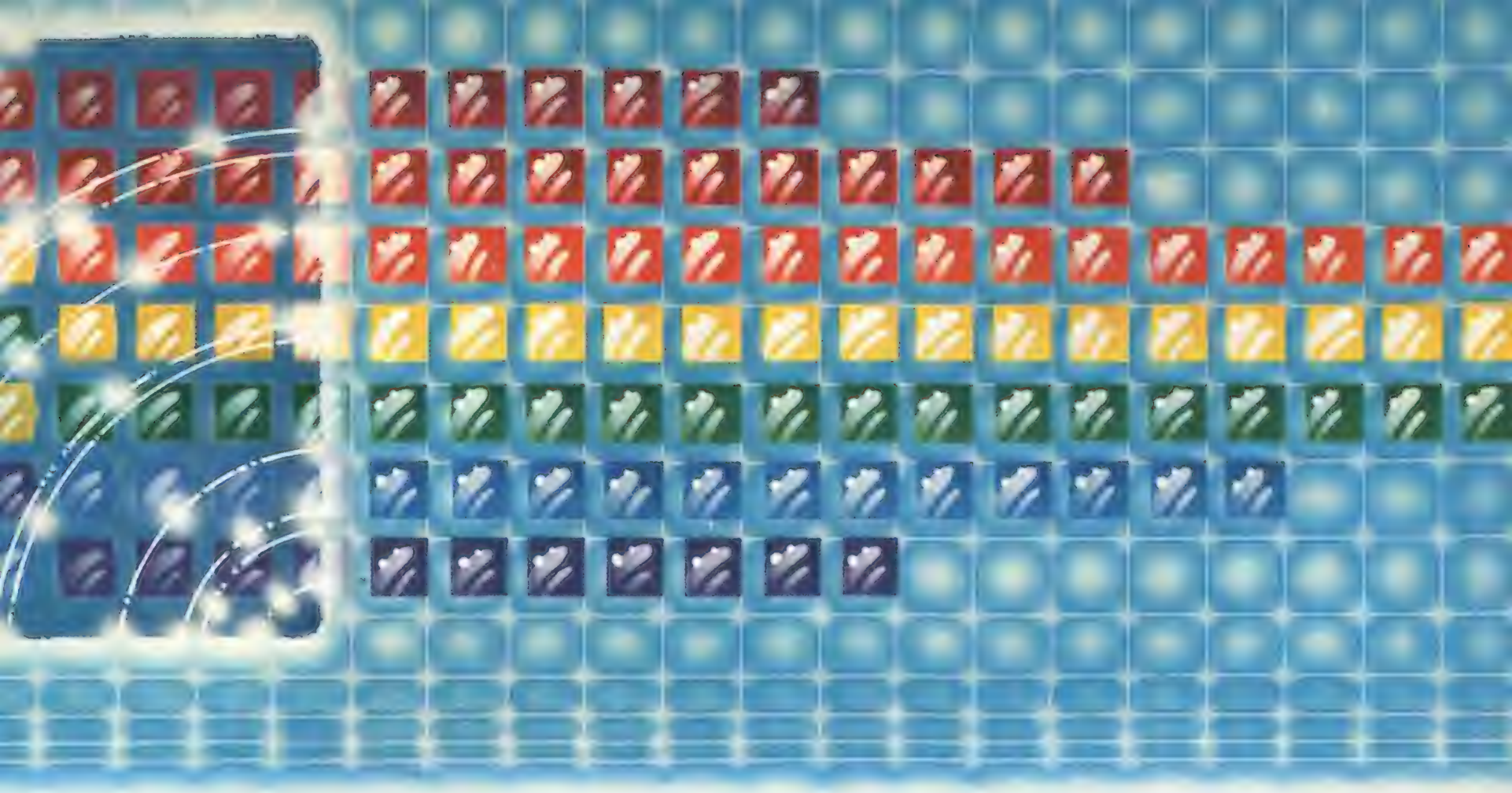

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The knowledge business

By Israel Shenker

For these global girdlers, the whole world is a stage

Be you a Wookie or Windsor, from its London headquarters Bermans & Nathans Ltd. will dispatch costumes to suit your every fantasy

Chances are that Morris (Monty) Berman could put an army into the field faster than a superpower. Several years ago, when Bermans & Nathans Ltd., the venerable London costume company of which he is managing director, was accoutering ten World War II films on location at the same time—in Britain, France, West Germany, Switzerland, Hungary and Israel—a casual observer might have thought there was a new Berlin airlift just for uniforms.

Not only is Bermans & Nathans, familiarly called Bermans, likely the world's oldest costumier (Nathans goes back to 1790 and the house of Bermans absorbed the house of Nathans in 1972), but it stands crowned head and ermine-draped shoulders above the competition. By way of proof, American devotees of British television need only consider a few of its sartorial triumphs: *The Forsyte Saga*; *Upstairs, Downstairs*; *The Six Wives of Henry VIII; Elizabeth R*; *Edward the King*; *Jennie*; *Nancy Astor* (a potential triumph being fitted, opposite) and enough versions of Shakespeare to constitute shameless bardolatry.

The company annually outfits more than 70 films alone, and Monty Berman thinks of himself not as contributing to the films but as making them. He has a habit of dozing off at home before his television set, but as soon as he remembers that Bermans provided the costumes he comes fully awake. "We did *Moulin Rouge* from top to toe," he says, on the heels of a recent rerun, and his nodding acquaintance extends to such renowned productions as *Doctor Zhivago, The African Queen, Superman* (I and II) and *Raiders of the Lost Ark*. Four films nominated for the costume-design Academy Award for 1977 bore Bermans' mark.

While Bermans' efforts span the ages—from Raquel Welch in fish skins (latex rubber) for *One Million Years B.C.* to space dress for *Star Wars*—Berman personally prefers military attire to the futuristic, dismissing science-fiction costumes as "four sides to a square and a bit of padding." To garb *Gandhi*, his staff assembled about 800 costumes—all of the European clothing. They would love to have done the Mahatma's loincloth as well, but apparently ceded the honor to the operator of a loom in India. *Ryan's Daughter* also owes her wear-with-all to the firm. "We prepared 2,000 Arab outfits for a big film in Morocco," Berman says offhandedly of his global enterprise, "and 600 uniforms for an Iraqi production in Baghdad," for which the company was, at the time of my visit, awaiting a quotation on war-risk insurance.

Bermans has a venerable tradition to maintain. When Charles Dickens needed costumes for one of his amateur theatricals in 1851, did he object to being charged one pound ten shillings for Mr. Nathan's personal "attendance," a guarantee of service and authenticity? Herbert Beerbohm Tree, Ellen Terry, Lillie Langtry, Henry Irving, Mrs. Patrick Campbell—all were clients of the house.

Gowns for royal Red Riding Boots

When Queen Victoria's circle needed costumes for *tableaux vivants*, Nathans often filled the bill. Her successors took the royal cue: for the 1944 Christmas pantomime of *Old Mother Red Riding Boots*, with Princess (now Queen) Elizabeth as Lady Christina Sherwood and Princess Margaret as The Honourable Lucinda Fairfax, costumes were—naturally—from London's ultimate suppliers. Princess Margaret submitted a design for her own gown, which interested but did not intimidate the costumiers: they changed the bodice, modified the neckline and lengthened the sleeves. The line of Windsor (SMITHSONIAN, October 1981) may be supreme in Britain, but the line of Bermans & Nathans sets fashion all over the world.

This union of needle-and-thread dynasties feels a special reverence for founder Lewis Nathan, "Nathan the Original," and for John Lewis Nathan, "The Great Nathan," who died in 1922. Archie Nathan, hardly less original or great, ruled until 1968 and was a wizard of illusion who enabled fat people to be thin,

On location in *Nancy Astor*, a youthful extra watches a TV aide adjust her Victorian costume.

Photographs by Michael Freeman

From reception-area "office," Monty Berman rules costume empire, monitored by father Max's portrait.

old to be young and vice versa. His son and nephew forged the link with the Bermans.

The head of *that* dynasty, Monty Berman, was born and bred for high office. He came into the business in 1912, aged two months, to be deposited on a cutting table and made the subject of great prophecies. Today, with every prophecy fulfilled, he exhibits a sovereign will and imperious ways. When he recalls the glories of his own forebears, he glows with pride, his voice grows more vibrant, his imagination soars and he finds himself describing his paternal grandfather as a stalwart of Russia's czarist Imperial Guards, with a rumored sideline as a tailor to the Romanov court.

Round about 1885, czars being what they were, Grandfather emigrated to London and took to sewing costumes at home. In 1900, his son Max—Monty's father—set up a tailoring business to make costumes for West End musicals. Young Monty left school at 16 and three times traveled to New York to make his fortune. The first time he looked, the second time he manufactured novelties for nightclubs and the third time he helped start a tailoring business at 46th Street and Broadway. Following wartime service in the Royal Air Force, he went home and right back into the family business. "We've got a chance," he remembers saying at the time. "Let's grab this thing. We're better than the other blooming costumiers.

"Any designer came in—we would help her," he recalls with pride. "With rationing, what we couldn't buy in the way of fabrics, we dyed horse blankets. We never said no. If somebody said they wanted something, we always said yes. Sheer bloody hard work and knowledge. We worked six-and-a-half days a week, at least 12 hours a day, and we won."

Berman now commutes between the Irving Street retail establishment that caters to individuals who want to rent fancy dress, and the great five-story emporium at 40 Camden Street that is a combined factory, warehouse and world headquarters for the wholesale business conducted with stage, cinema and television. There he disdains the trappings of office to sit on a padded bench in the large entrance hall (at left) below a life-size portrait of his unsmiling father (five-foot-five, bow tie askew, trousers extra long). With its vast array of stars' photographs dedicated "To Monty," the hall resembles Sardi's restaurant in the Manhattan theater district, but with more open space for bowing and scraping. Berman is content with a phone on the table in front of him and, in the distant corner, a switchboard operator alert for his long-distance commands. When aristocrats arrive to plead for

From his home in Scotland, Israel Shenker wrote for SMITHSONIAN, *April 1981, on* The Lisle Letters, *six volumes about the Tudor England aristocracy.*

At London's Café Royal, model poses in Bermans' American-designed gown created for star Diana Rigg.

Being modeled here is a rare, fragile ensemble from Bermans' stock of original Victorian clothing.

grace and favor, his inner charm struggles to the surface. Viscountess Cobham wants to furnish Hagley Hall, her stately home in Warwickshire, with ersatz kings and queens to pull in the tourists; Berman receives the lady with a winsome display of esteem.

In 1979, Bermans earned about $2.5 million from exports, and one of the coveted Queen's Awards for Exports, though it should have been for *re*-export, since merchandise is endlessly reworked, rerented and redispatched.

A major customer of Bermans is Maggie McPherson, head of the costume department at the BBC. Her demand is so prodigious that a BBC van calls at 40 Camden Street each morning and afternoon. Her colleague Roger Reece suggests that smaller companies may give more personal service, but that Bermans has the largest and most varied inventory. "You want to get away from there being a particular costumier's stamp on your production, but it's well known that Monty Berman wants to be the biggest, best and, if possible, the *only* costumier in London."

Although some designers will just tell Bermans how much the production budget allows for costumes, most usually outline specifications, produce sketches and ask for quotations. Occasionally there is competitive bidding. In most cases, a designer chooses a given house because he likes working with particular people there. Bermans ask new clients—but not old—for a 50 percent deposit, with the balance generally payable in installments.

A layman wonders about the chronic "cast-of-thousands" problem—fitting costumes to crowds of extras. Simple, I'm told by designer Colin Lavers. Rent more costumes than there are people! In doing a Battle of the Somme sequence, he ordered 32 costumes for 24 extras. "If you were doing 500 soldiers, you'd only need 100 spares," he explains. By contrast, stars are measured for their clothing and then get two fittings. "Actors don't like going to fittings," confides Lavers, "but they'll moan if the costumes don't fit." He likes to parcel out his assignments to get the best practitioners for each category of costume. He often goes to

At retail branch, manager Gerald Moulin connects *Moonraker* helmet to a *Superman II* space suit.

competitors of Bermans for post-1800 civilian clothes, but "where do I get the Elizabethan costumes?" he asks aloud, answering, "I *have* to go to Bermans. If you want to outfit Henry VIII and his court, or Henry V and *his* court, or put on a Georgian production, you've got to go to Bermans."

For London's stage version of *Barnum*, with a total costume budget of about $185,000, Bermans is this day mobilizing its labor and ingenuity—and sacrificing its nerves. Plans for dressing the "oldest woman in the world," for instance, seem to go on forever. Experts veto synthetic crepe because the material does not dye well and gets spongy and thick and gray. But how to make authentic satin-backed rayon crepe look suitably blotchy and shaded? Eureka! Apply dye without preliminary wetting for the perfect blotch.

In the scramble to get *Barnum* on the road, secretary Jennifer Kaye shoves aside IN and OUT baskets and instead sits crocheting a vital accessory: a five-color scarf of Goldfingering, a glittering metallized yarn. At a nearby panic station, another aide-de-camp phones an outworker (a subcontractor who works at home). "Mr. Paisley," he begins, "you're making a ginger bowler hat." Gulping and summoning his courage, he continues: "We've had a change of cast. You *were* making a 22½. We now want a 23. Is there any way you can stretch it? Do the best you can."

The head of "new production," Fred Brazier, is startled to find that in Broadway's *Barnum*, details of the Beefeaters' costumes are wrong. "They got them off a bottle of Beefeater gin," he quips, "and the drawing wasn't detailed enough." Naturally, Bermans gets *its* Beefeater details from *the* Beefeaters and then—conscious of the awesomeness of the act—makes the dark-blue stripes *black*, theatrically more effective.

Good-bye alpaca and bombazine

"We try not to use synthetic fabrics because they don't behave in the same way as real materials," Brazier points out, although compromises sometimes impose themselves. Men and women used to wear alpaca, but alpaca is now almost impossible to get. In the mid-19th century, every fashionable woman had a bombazine dress; now this twilled fabric of silk and worsted is a disappearing species. Duchess satin is rare, as are silk faille and good quality silk grosgrain. "Since we can't get peau de soie, we choose something else," adds Noel Howard, a company director. "But anything else doesn't make up the same, it doesn't look the same, it doesn't move the same. Today you can't get the range of colors—red is red, blue is blue. You get silk taffeta, but you can blow through it, it's so thin."

Each project has had its challenges. For a boating sequence in *Julia*, Jane Fonda and Vanessa Redgrave were to have worn yellow oilskins. "You can't buy the shiny yellow oilskin," Brazier complains. "The manufacturer refuses to sell just the material. We could get only matt. The designer suggested painting it with emulsion glaze. We did and it made the coats rock hard. That was all right—the actresses didn't have to move and it was a short sequence. But when water hit the glaze, it went opaque white. So they did a distance shot and that was it."

When Roman Polanski was shooting *Macbeth*, a designer recounts, his vision of one scene consisted of snow-covered landscape and white-clad actors, but the snow refused to appear. Several hundred white cloaks were rushed back to London from location in Wales to be whipped through a dye to make them suitable for Welsh verdure.

In *Nicholas and Alexandra*, the medals of the Order of St. Catherine absolutely *had* to bear a tiny enamel painting of the saint, so a resident artisan hand painted her, time and again. And the order ribbons were woven—to order. Women in the royal family had

"It's life as usual in the big wildlife reserve nearby," says Orval Fouse, Supervisor, Utilities & Environmental Engineering at Gulf's Port Arthur, Texas, refinery. "The snow geese still spend a few months here each year during migration. The marshes around the refinery are still full of raccoons, otters, minks, muskrats, even some deer and bobcats.

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Snow Goose (C. Caerulescens), photographed near Gulf's Port Arthur refinery by Dr. John Tveten.

In millinery department, headgear is fashioned for marchionesses and milkmaids, nurses and nuns.

Lisa Wescott (right) has a fitting for one of her dresses from new production of *The Sound of Music.*

Costumes—carefully labeled with names of show and actor—are unloaded from van at London theater.

to have five little broken bars of silver on each side of their order sashes, so these were applied by hand. "If we hadn't done it maybe nobody would have noticed," Fred Brazier suggests, although Bermans normally shuns the very thought of lese majesty.

For a TV series on Horatio Nelson, special-effects men produced a trembling cockade on the admiral's bicorne. (Nelson's own cockade actually fluttered by means of a clockwork device; it was the heroic commander's only feature ever to betray agitation.) In *Star Wars,* Chewbacca, the Wookie, was fitted out in a cat suit of mohair, with a head-to-toe overlay of human hair woven into the fabric. In *A Little Night Music,* Diana Rigg's dress (p. 159), modeled by American designer Florence Klotz from a Gustav Klimt painting, was embroidered by hand. For *Mommie Dearest,* engineering know-how constructed Joan Crawford shoulders for Faye Dunaway—some two-and-a-half inches beyond her own.

During the filming of Shakespeare's life, Patience Collier, who played Queen Elizabeth, is said to have patted her regal gown and remarked, "If all the time and trouble had gone into England which went into this dress, we wouldn't be in the mess we're in." Elizabethan court costume for lesser ranks rents for about $50 for eight to ten weeks. A whole court can be togged out for $1,000. "I can give you a thousand Bolshevik soldiers for a year—a hundred pounds [$185], maybe, each," estimates John Gudenian, Bermans' deputy managing director.

Today, bigger waists and higher bosoms

On the Camden Street premises, Harry Snider enjoys the title of technical consultant, and while his word is not law—only Monty Berman can legislate—his experience is not lightly taken. Snider is a fifth-generation tailor in a family whose name (originally Schneider) comes from the German and Yiddish word for tailor. He retired as a company director at 70, in 1975, and has worked ever since as senior cutter and veteran authority. "Bodies have changed," he observes. "Women's waists have gotten bigger. Busts were pendulous, and now—thanks to modern brassieres—they're higher, although the braless fashion has reversed that somewhat."

"Corseting the women can be difficult," Fred Brazier adds. "In the 18th and 19th centuries, they wore corsets as a matter of routine, so the 16-inch waist was common. That's why the women were passing out all the time. But men can be difficult as well. In 18th-century coats, the shoulders were narrow—sometimes armholes were only 12 inches apart at the back. You have to cheat—make it as narrow as you can."

But Anthony Mendleson, who designed the cos-

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Bermans & Nathans: wardrobe wizards

tumes for such films as *Kind Hearts and Coronets* and *The Man in the White Suit,* takes 20th-century bodies in stride. "With women, you can help with corsets and general body underpinning. It's no good saying, 'Oh, I can't breathe in this.' The really good actress will go to any length of discomfort to get the right look. I did the costumes for Glenda Jackson in *The Incredible Sarah* [Bernhardt]—she had to go through three periods with three different shapes of corset and she never complained."

And just how many outfits hang on Bermans' collective racks? "We have about 700,000 costumes in this building," Monty Berman states. "My estimate is about a million and a half," offers Gudenian. "Maybe a million," suggests Walter Allen, a company official who has been on the job since 1955 and who now steers a careful middle course between the exuberance native to show business and the caution proper to double-entry bookkeeping.

As Allen lopes from floor to floor, passing men and women cutting patterns and stitching up new productions, he intones a running commentary: "Ethnic costumes here. Somebody wants a Bulgarian peasant, a Swiss milking maid, a Venetian gondolier, a Spanish bullfighter? Look here—nothing but nurses. Modern nurses and nurses all the way back to Florence Nightingale. Four hundred nurses. Schoolchildren's uniforms. Archduchesses and things like that, that's the fourth and fifth floors."

Long racks labeled "Bustle Daytime" stand alongside racks marked "Bustle Evening." Allen estimates bustles in stock as 500, to say nothing of those swishing on location. Cards identify other racks as "1910 Evening Dresses," "1910 Suits." "This is always the biggest turnover," he says about the long line of costumes marked "Edwardian Evening 1890" and "Edwardian Day 1890." "For French TV—the life of Mozart," he notes, gesturing toward an array of black coats. "We're doing 900 costumes; imagine if he hadn't died young! Here we're doing the Borgias—practically all finished. And these were used in the Shakespeare series on TV. This is our ecclesiastical section. You want to be a bishop, a pope, a cardinal, a priest, a nun, a rabbi? This is 1660 Charles II, the Georges, Charles I Cavalier. These costumes are 1760, 1700, Elizabethan. Crinolines, petticoats, panniers, pregnancy pads, hip pads—never seen, but essential to make the costume sit right. About 700."

"Beefeaters," Allen goes on, pointing to the gaudy cloaks. "Time of Henry VIII and Elizabeth. Eighteen of those. A lot of Arabs. Davy Crocketts. Early medieval. Late medieval. That's Peter O'Toole's costume from *The Lion in Winter,* Richard Burton's costume from *Anne of the Thousand Days,* Sir Laurence's —he's Lord Olivier now—from *Richard III.* Cummerbunds, ties, braces, ladies' hats—all those bins. These gold-braid uniforms are what the Queen's representatives wore abroad. In the days of the Raj we were important. That gold embroidery must cost about two or three thousand pounds today.

"When you see the Queen driving down the Mall in her golden coach, these are the cloaks of the blokes who sit on the back. Feel how heavy that is." Allen struggles to lift one of the massive garments, then quickly disengages and proceeds to a locked security area that houses police uniforms: American police, Spanish policía, British constables, French gendarmes, Italian carabinieri. "It's all very well to say 'a policeman's uniform,' " he complains. "We have to know *exactly* the period—and whether it's winter or summer."

Allen next advances boldly into the "war zone," where earnest technicians are finishing a *tableau mourant* that shows the death of Admiral Nelson. It will be used to publicize the forthcoming TV series.

For bayonet holders, a sickly green

"British army 1914 to 1918," Allen notes, as we march into a new century. A young man, wielding a brush with the delicacy of Michelangelo, stands at a bench painting 350 canvas bayonet holders a regulation sickly green. "American Second World War uniforms —officers and other ranks—I should think that we could do about 3,000," Allen estimates. "All the Japanese World War II uniforms you could possibly want, and then some. Death and glory boys for *The Charge of the Light Brigade.* Kilts. We needed 800 for one production alone."

Silently he passes a mannequin in an RAF World War II flying suit, with oxygen mask on. Then a white uniform erroneously marked "Adolf Hitler" (this was just Bermans trying to save a copper by recycling

Sygma

Coy Faye Dunaway wears Charles I finery in film *The Three Musketeers.*

20th Century-Fox Film Corporation

Bermans-dressed Darth Vader towers over Carrie Fisher's Leia in *Star Wars.*

Sygma

Christopher Plummer (left), Harrison Ford pass as Nazis in *Hanover Street.*

Sygma

Actor William Devane (right) wears a U.S. Army World War II uniform from Bermans in *Yanks.*

Sygma

For *Julia,* Bermans swathed Jane Fonda in a lustrous period sheath and jacket.

Occupants of the *Moonraker* control center sport practical, high-visibility jump suits.

identification cards; the other side of the card came closer, labeling the uniform "Infantry Police Cossack 1917 Summer"). One wall is lined with the company's private stock of military gewgaws: regimental badges, decorations, braid, buttons. "Don't just say 'regiment,' " Allen advises. "Which regiment? If it's East York, we've got to produce East York badges."

We pause briefly at the house library, a shrine for designers who want authenticity in their costumes. Bermans keeps long runs of *Life, Paris Match, Picture Post, Illustrated London News* (back to 1842), *Vogue* (1920), *Tradition* (1964), *Femme Chic* (1960) and the *Journal of the Society for Army Historical Research* (1938). There also are rigorously specialized works such as *Head-Dress Badges of the British Army.*

Allen suddenly throws open the door to a great warren heaped with military paraphernalia—and two apparent victims of battle, employees whose full-time job is the upkeep of battle gear. Bent over a mound of army boots, these gloomy figures, veterans in absentia of many foreign "wars" shot on location, are dusting boots sent back from the trenches.

Clothing, both military and civilian, gets soiled, and the annual bill for dry cleaning—done off the premises—is more than $150,000. Delicate costumes are hand cleaned at around $40 a garment. Where there is wool there are moths, so every few months the exterminators arrive on a Friday evening and spray.

Allen next hurries on to the glories of a large, well-upholstered, modish dressing room in which stars try on their costumes: "It has to be big enough for the director and artist and makeup people and all the schmaltz that goes with them."

Back on the ground floor, he directs my attention to the crown-jewel replicas. Bermans has recently launched a subsidiary theater shop that offers a choice stock of memorabilia: lace, collars, garters, nightcaps, fans, buttoned shoes, Edwardian watches, costumes, theater programs. It draws the line at swords. The Nathans, who supplied Disraeli with the sword he wore on his first visit to Queen Victoria's court, and who—with imperturbable neutrality—armed Gladstone as well, once swallowed an entire sword-making business. But someone stole tens of thousands of dollars worth of inventory, leaving the company practically defenseless—rich in uniforms, humble in steel.

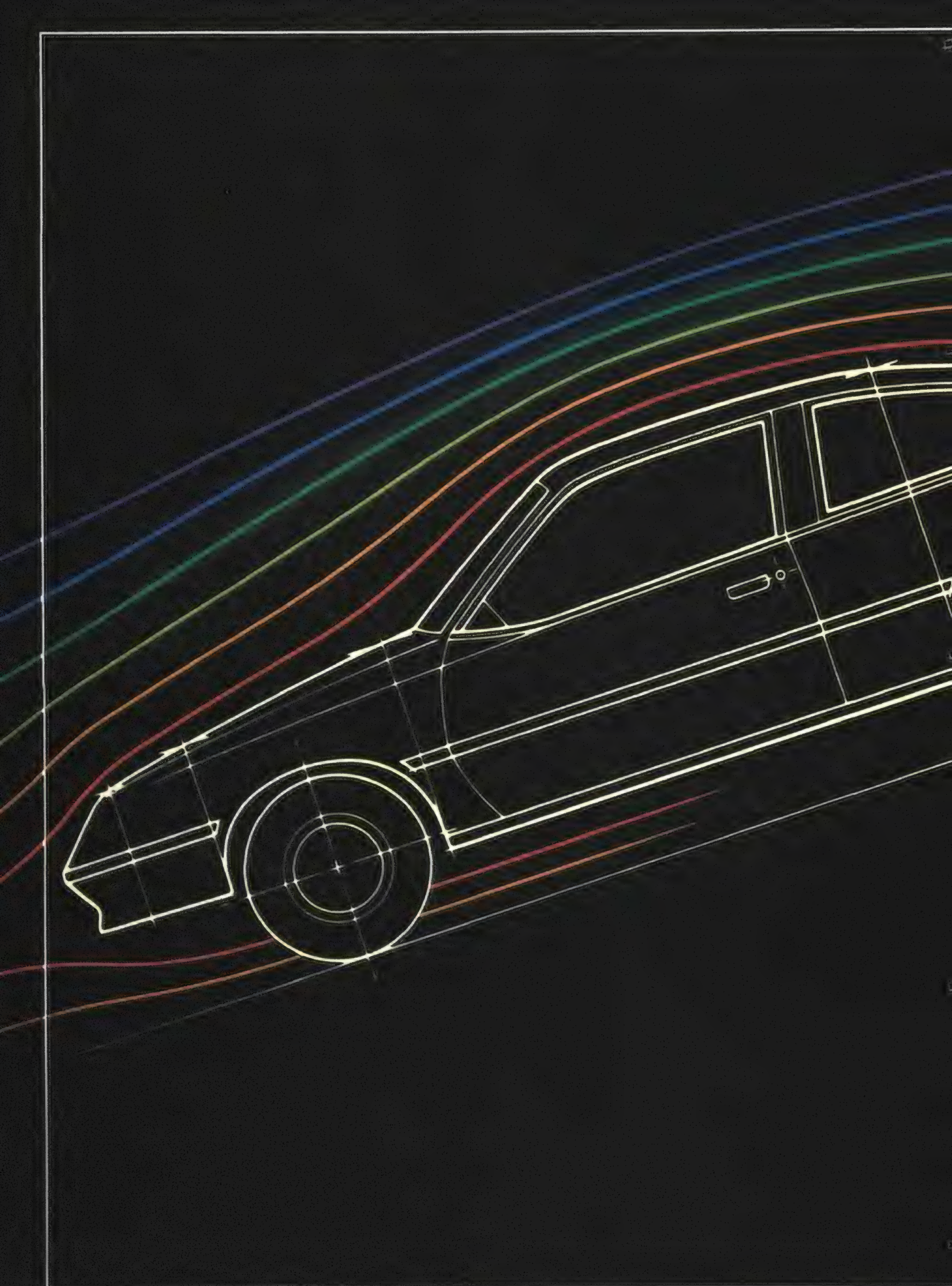
"If I can find 14 Elizabethan swords now I'd be lucky," John Gudenian says. "But we can still do shields and spears, and we have a good stock of armor —plastic and metal. The trouble with real armor is that it's hard on the kneecaps when knights kneel on chain." These days, synthetic chain mail is made of knitted string dyed gray by ironing graphite powder onto it under great pressure, a procedure that gives the "chain" a hammered, burnished look. When a rare director insists on *real* chain mail, Bermans goes to the company that supplies the protective carapace—small, linked rings of iron worn on the back of the hand—to butchers at London's Smithfield Market. Richard Lester, director of *Robin and Marian,* wanted the armor to "look right," so Bermans sent patterns to the carapace manufacturer, who sent back whole suits of protective chain almost too heavy to lift. One of the stars refused to wear his; Lester, to protect his investment, wore the armor himself for a whole day and literally shamed the actor into it. When links kept coming loose because of the weight, an armorer was hired to stand ready with his pliers.

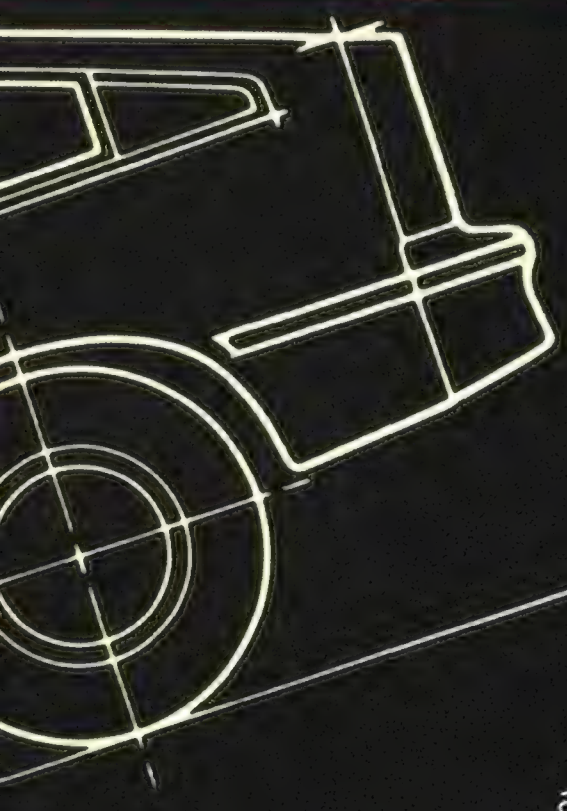
Monarch of all these London machinations, as well as agents in New York, California (in the person of brother David), Paris, Rome, Amsterdam and Munich, Monty Berman's whims are law and his wrath a mighty force. At weekly production conferences, the sound of him exploding is enough to chill the blood and send the staff of some 160—dressmakers, cutters, tailors, milliners, executives, secretaries, artificers—running for cover. "I get impatient if things don't get done quickly," he admits. "I feel terrific anger if it's not done 100 percent. The standard I call for is very hard to achieve in this day and age."

As day turns into night, costumes hanging in wardrobe cartons go off by air, rail, lorry or ship to companies on location in remote corners of Europe, Asia and Africa—even into the wilds of America—with scheduling tight and efficient. "We don't want to tie up the stars, tie up the costumes," Berman declares. "We don't like messing about."

Leering Dracula mannequin and Dracula's mummy (rear) stand stored but ready for new costumes.

DRACULA
CHRIS LEE
P.H
LAWREN





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Three Atlantic salmon jump up a waterfall as they head toward river headwaters where they will spawn.

By Ted Williams

The long journey home of the leaper, 'king' of the fish

The magnificent and mysterious Atlantic salmon has suffered much at the hands of Man, but a restoration effort is now under way

To those who know it, the Atlantic salmon (*Salmo salar*) is much more than a fish. Throughout history it has been a creature that moves humankind, that inspires, mystifies and intrigues. Twenty thousand years ago, when cave lions and mammoths prowled and plowed through southern Europe, Cro-Magnon man scratched renderings of Atlantic salmon onto reindeer antlers. Two thousand years ago Roman legionnaires marveled at this torch of life flashing from the rivers of their expanding empire. More than 300 years ago Izaak Walton hailed the salmon as "king" of fish, a title it bears to this day.

The salmon can vault six feet into the air, hit a waterfall and swim *up* it. It is acrobatic, powerful and superb to eat. *Salmo salar* is "king" because it has a monopoly on the qualities by which people judge fish.

But the allure of the Atlantic salmon cannot be explained this easily. Some of the answer may lie in the salmon's ocean wanderings. "Despite intensive investigations," writes Anthony Netboy, author of four books on salmon, "the ocean remains as it was for the ancient Greeks: a mysterious part of the planet. In its depths dwell multifarious creatures with shapes and bodies and biological characteristics that puzzle and fascinate us. When the salmon plunges into the sea it becomes part of that mystery. . . ."

Then, in a river barren of adults for a season or a year, a salmon will appear, who knows when from who knows where—a sudden, subtle shimmering seen only, if at all, by those who are looking hard. Where

has it been and what has it seen? How has it found its way back? One navigational tool is the nose. The sense of smell is so acute in salmon that a bear's paw immersed in an upstream pool can bring migration to a complete standstill for five minutes.

In one experiment, Pacific coho salmon (close relatives of Atlantics) were captured as they ran up two tributaries of the Issaquah River in the state of Washington, then placed in holding tanks. Half the fish had their nasal sacs plugged with cotton wool. Then all the fish were transported below the convergence of the two tributaries and released in the main river. The great majority of normal fish chose the right stream, while the nose-plugged fish made their selections almost totally at random.

But smell alone cannot guide Atlantic salmon from the west coast of Greenland (where most of these North American and European fish winter) to, say, a certain pool on Newfoundland's Upper Humber River. The fish must somehow navigate to within smelling range. Perhaps they plot their course by solar radiation or by Earth's magnetic fields. One recent theory holds that gyres—the rotating ocean currents that abound in the Northern Hemisphere—guide the salmon at least to the proper coast, where they presumably "sniff" until they scent their natal streams.

From egg to parr to smolt to adult

Adult Atlantic salmon, weighing anywhere from four to 60 pounds, can reappear in the river at any time from spring to fall after spending one to four winters at sea. Spawning takes place in the fall in cool flows over clean gravel. The young break out of the orange-red, pea-sized eggs in late winter or early spring —grotesque creatures all eyes and yolk-filled bellies. They are sustained by yolk for several weeks, then begin to feed on microorganisms and insect larvae, growing to a length of about two inches. Now their light flanks are flecked with ruby and obsidian and barred with dark, vertical bands.

Depending on water temperature and food abundance, parr—as they are called at this stage—may reside in freshwater for as little as 12 months or as long as five years. But there will come a time in some spring when each young salmon will undergo a sudden metamorphosis.

Within a month flecks and finger marks disappear under a coat of iridescent silver. Drastic internal changes reprogram body chemistry for saltwater. The scent of the home water is imprinted on the brain. The parr has become a smolt and on some natural signal lets the river sweep it to the sea.

Salmo salar has the ability, unique among salmon, to recover after spawning. A few—on the whole about

These fish were caught on Norway's Lågen River in a wooden trap, a traditional device for taking them.

In a nest called a redd, a female salmon deposits about 700 orange-red eggs per pound of body weight.

five percent—are able to return to saltwater, mend themselves and eventually make at least one more spawning run. How?

"We don't know," says Dr. Wilfred M. Carter, the busy and brilliant director of the International Atlantic Salmon Foundation headquartered at St. Andrews, New Brunswick. "But I wish we did, because I think part of the answer to the mystery of life itself may lie there. Perhaps it would provide a breakthrough in human medicine. If you follow the transformation of the principal glands of the Atlantic salmon—the pituitary, adrenal and kidney—through the spawning run from the time the fish enter the river until they actually spawn, what you see is a period of increasingly intense activity in these glands. As the fish get close to spawning, those organs disintegrate. If you slice them very thin and look at them under a microscope, you can easily see the evidence of disintegrated cell tissues. But that five percent fraction somehow is able to reverse the process and come back from the brink. These glands will then regenerate, like glands of freshly born animals."

What *Iliads* and *Odysseys* we could read in *Salmo salar*'s scales and glands and cells, if we could only understand. But we barely understand at all. So, like the ancients, we fill the wide gaps in our knowledge with mythology. It is, for example, widely known to anglers that the Atlantic salmon's long-secret winter lair—in the Davis Strait off west Greenland—was first discovered by U.S. atomic submarines. As Canada's *Weekend Magazine* reported on March 11, 1972: "In the late 1950s and early '60s, the U.S. atomic submarines cruising up (or under) the Davis Strait between Greenland and Baffin Island on their way to the North Pole noted thousands of fish suspended vertically like 'fishicles' from the bottom of icebergs and floes. These were salmon feeding on the myriad small shrimp that abound in these frigid waters. Quite by accident the deep-sea feeding grounds of the Atlantic salmon had been discovered. The fishing boats were close behind." The fact that not a word of it is true and that the thoroughly horizontal fish had actually been blundered onto by mundane codfishing boats spoils the story not in the least.

Further, it has long been known by old-boy anglers that when salmon find their migration routes blocked by especially high obstacles, they grip their tails in their teeth, tense, release and hurtle skyward. Doubters need only consult Michael Drayton who, centuries ago, wrote in his *Polyolbion*:

> Here when the laboring fish does at the foot arrive,
> And finds that by his strength he does but vainly strive,
> His tail takes in his mouth, and, bending like a bow
> That's to full compass drawn, aloft himself doth throw....

After hatching, the half-inch-long young, or alevins, take nourishment from yolk sacs in their bellies.

Even today, despite millions of dollars invested in research, *Salmo salar* remains one of Earth's great unsolved mysteries. We can't even answer the little, simple questions. What, for example, caused the crash of 1979, when great numbers of salmon throughout much of their range never returned to their rivers? Somehow, the Atlantic Ocean seemed to have swallowed them. Was there an unknown cataclysm at sea, as has been repeatedly suggested in salmon-conservation circles? It seems too pat an answer. Destruction of the food supply may be a partial explanation. While the world's salmon-producing nations were fighting high-seas salmon netting by the Danes in the early 1970s, they were also watching the Russians extract several hundred thousand metric tons of capelin—the smeltlike fish that seafaring salmon depend on so heavily for forage.

Biologists don't even know why Atlantic salmon strike things like twigs, flies and cigarette butts. Whatever the reason, it is not that they are hungry. Salmon, running out of the sea, do not feed in freshwater, and therefore pursuing them is like pursuing no other fish.

Ted Williams is an environmental writer whose baseball career ended in high school. This article is adapted from The Ultimate Fishing Book, *to be published by Houghton Mifflin later this month.*

As angling pundit Lee Wulff puts it, one must appeal to their minds instead of their stomachs. Do salmon strike out of anger? Perhaps. When a salmon is grazed by a hook, he sometimes seems to respond by striking again and with greater ferocity.

Anglers customarily stalk salmon with flies, concoctions of feathers dressed on a light hook; these are fished either on the surface (dry) or submerged (wet). Does the vision of an artificial fly evoke subliminal remembrances from parrhood, when the fish gorged on insects struggling in the surface film of tiny woodland rills? Maybe. In Iceland, where few surface insects are available to parr, it is extremely difficult to raise adult fish to dry flies. Every salmon follower has his theory about why salmon hit and delights in advancing it long into the night.

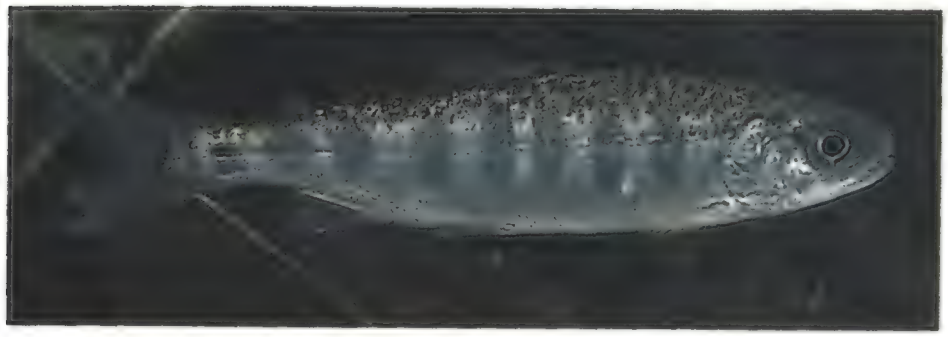
Why is fly pattern and size critical at times and unimportant at others? Why will salmon sometimes play with dry flies, trying to sink them with their noses, seemingly taking perverse pleasure in the raging electrical storms they create in human nervous systems? These questions are not likely to be answered in the near future.

The behavior of a striking or hooked Atlantic salmon, while explosive, is perhaps less shocking than that of the creature on the other end of the line. Certainly one of the greatest mysteries about *Salmo salar* is how it can compel a presumably rational human being to drop $3,000 for a week's fishing—*after* he has paid for transportation to the lodge. If you are perfectionist about it, it is possible to spend $10,000 for a week on one of the better Scandinavian rivers. And even there, one salmon every other day is generally considered good fishing. An adequate salmon rod and reel can be had for about $100, but "adequate" is not a word much favored by salmon anglers. After all, if one has obtained an audience with the king of fish, it hardly seems fitting to enter his domain brandishing the crude tools of the grunting masses—especially when one will be casting under the watchful eyes of one's peers. A good rod of, say, boron graphite currently sells for slightly less than $300, a good reel for slightly more than $300.

Since salmon flies are taken for reasons unknown to the angler and maybe even the fish, their evolution, unlike that of trout flies, has not been constrained by natural law. With a few exceptions, salmon flies resemble nothing that ever flew or swam (pp. 174-75). Their names, some as colorful and outlandish as the patterns themselves, often evoke the spirit of the places they were conceived and the men who sat in the lodge or pullman or ferry, bent over the vise while the gaudy concoctions of fur, feathers, silk and tinsel first took form. Names like: Cosseboom, Prince Boris, Green Highlander, Scargill's Fancy, Royal Wulff, Thunder and Lightning, Blue Charm, Rat-Faced McDougall, General Practitioner, Lady Atherton, Dusty Miller and Jock Scott. This last can involve assembling more than 30 components in more than 30 operations.

Collecting these flies has become a hobby in itself. In some cases old flies have to be untied to obtain feathers for new ones, because the birds that once relinquished them are now endangered or extinct. Customers are sometimes limited to three or four flies and asked to wait several years. Rare is the angler who fishes with such creations, even if he can still afford a fishing trip after he has paid for them.

One might surmise from all this that humans regard Atlantic salmon as a natural treasure to be cherished and preserved. But, on the whole, such is not the case. The things humanity has been doing to Atlantic salmon include choking their rivers with pollution, drenching their watersheds with biocides, cutting off their spawning habitat with dams and massacring them on the high seas. We may even attack them with bombs, this last insult by the Russians. They have planned to blast a canal at a future and as yet undecided date in an effort to reverse the flow of their magnificent Pechora River, so that it will discharge into the Caspian instead of the Barents Sea.



In time young salmon becomes a parr, from two to six inches long. Male parr can be sexually mature.

Eventually the parr trades its barred markings for the silver coloring of a smolt, ready for the sea.

Long journey of the Atlantic salmon

A grizzled angler fishes a stream in Iceland, which contains many of the world's best salmon rivers.

Bright and gaudy, salmon flies (shown here slightly larger than actual size) nestle in angler's fly box.

Among the many peoples who attempted to destroy their Atlantic salmon, few have met with greater success in doing so than the Americans. By 1810 dams had all but eliminated the fish from the Connecticut, probably the greatest Atlantic salmon river ever to have graced the continent. Servants in the Connecticut Valley stipulated in their contracts that Atlantic salmon—a fish that currently retails in major U.S. and European cities for anywhere up to $9 a pound fresh and a lot more smoked—*not* be served to them more than thrice weekly. In New England, it is said farmers harvested migrating salmon with pitchforks and used them for fertilizer.

The other great salmon rivers of the Northeast fell quickly: the Merrimack, the Kennebec and the Penobscot. By the mid-20th century, *Salmo salar* was virtually extinct in the United States, surviving only in remnant runs in two Maine rivers.

Elsewhere in the Atlantic salmon's natural range, stocks have dwindled steadily. Pressure from salmon-producing nations has forced Denmark (a nonproduc-

On honeymoon at Balmoral Castle, Scotland, last summer, Prince Charles cast for salmon in River Dee.

ing nation) to stop its ocean netting off west Greenland, but some commercial fisheries are expanding efforts. A maze of nets strung along the Canadian coast is reducing North American runs. From his camp on the Miramichi, one of the continent's most famous Atlantic salmon rivers, "the real Ted Williams" (as the author, to his considerable chagrin, has heard the elder and more accomplished angler/ballplayer called) agitates against this devastating exploitation: "They are just about destroying the salmon runs," he booms.

With a rod-caught salmon contributing perhaps as much as 15 times more to the economy than a commercially caught salmon, netting in freshwater makes no sense, but at least there is the chance for sound management, for adjusting harvest to ensure survival of the river's population. Saltwater harvest, even in territorial seas, is insanity. "In the high seas feeding areas, salmon stocks are inextricably intermingled," writes Dick Buck, chairman of Restoration of Atlantic Salmon in America, Inc. (RASA) and adviser to the State Department on Atlantic salmon. "They come from different spawning streams, different river systems, different nations, different hemispheres. No man, and no type of fishing gear yet known to man, no method of control, can separate them out."

All this may change, however, in the next few months if a multination Atlantic salmon treaty, hotly negotiated these past two years by the major producers and users, is ratified.

"A great deal of the salmon's fortunes hangs on how good a treaty we get," declares Wilfred Carter. Not only would a strong treaty ensure some kind of method to the current harvest madness, it would, Carter says, "provide for worldwide data gathering and sharing. Good management of any resources depends on good data. And we don't have really good data on the North Atlantic salmon."

This is not the first time Americans have tried to restore their Atlantic salmon. They tried and failed more than 100 years ago. In 1874 the New England states released 1,189,000 fry in the Connecticut River

A salmon for the table is simply prepared but elegantly served at a resort hotel in Norway.

system. A few adult fish returned, but they were pounced upon by commercial netters and the whole restoration effort fizzled.

Then, and for the next century, biologists believed that all Atlantic salmon were created equal. Only in the 1970s were they to learn that this is not the case, that each of Earth's Atlantic salmon rivers supports a genetically unique strain of *Salmo salar*.

Even stocks populating tributaries are genetically different from stocks populating main stems, so that in a major river system like the Connecticut there may have been numerous races of Atlantic salmon. When a salmon run is extinguished, it is not just that a river is out of fish and needs to be restocked; instead, a unique life form has been rendered extinct.

So what we have had to do is preside over the actual evolution of new subspecies, first stocking the progeny of fish from the most similar Maine and Canadian rivers, capturing the few adults that made it back; stripping their eggs and milt and rearing smolts that are a little better adapted to the river than the part of the parent generation that did *not* return; stocking the smolts; capturing the returning adults in order to rear a third, better generation of brood stock and, eventually, a fourth and a fifth and a sixth. It is an agonizingly slow process that strains the patience of sportsmen and politicians.

This year that strain was evident when the Reagan administration proposed to withhold from the U.S. Fish and Wildlife Service and other agencies the annual revenue earmarked for salmon restoration. According to Buck and Carter, the loss of the funds would hurt but not cripple America's effort to rebuild its Atlantic salmon runs.

It has only been in the last several years that this effort has produced spectacular results. Fifteen years ago Maine had 1,600 square miles of watershed suitable for Atlantic salmon. Today, with the cleanup of the Penobscot and completion of fishways (stairstep arrangements allowing the salmon to surmount dams), the figure is somewhere between 7,500 and 8,000 square miles. The Penobscot's salmon run has increased from zero in the mid-1960s to about 130 in 1970 to about 3,300 by September of 1981.

Restoration of the Connecticut, at the southern extremity of *Salmo salar*'s natural range, has been more difficult. That run has increased from zero in 1974 to about 90 in 1978 to about 520 in 1981. This spring, with the completion of the fishway at Vernon, Vermont (just over the state line), salmon migrated deep into Vermont waters for the first time since 1797. With this year's impressive run and 334 fish now being held for brood stock, the major stumbling block to complete restoration of the Connecticut—a lack of suitable eggs—seems to have been overcome.

Things are going well on the Merrimack, too. Restoration is just getting under way on Rhode Island's Pawcatuck River, and the little Maine rivers like the Machias and Dennys and Narraguagus are moving gradually toward their full potentials.

Everything, however, is not salmon pink. The rush to develop low-head hydroelectric facilities is bad news for Atlantic salmon advocates. Entrepreneurs have all kinds of plans for development along New England's rivers.

A serious threat to America's reborn Atlantic salmon runs is acid rain. Sulfur and nitrogen oxides combine with water vapor to form sulfuric and nitric acids that precipitate over buffer-poor areas of the northeastern United States and eastern Canada. Already this, the most unpopular of all American exports, has wiped out eight salmon rivers in Nova Scotia, and damaged many more. Acid rain is hurting some American salmon rivers, too, and if it is allowed to continue they may deteriorate. The Clean Air Act—which may be further weakened—currently is not used to control acid rain.

The more we realize that we cannot have Atlantic salmon back quickly or cheaply, the more we wish we had them now. But even this manifestation of human nature, together with every quality and mystery of *Salmo salar*, does not fully explain the allure of this remarkable fish. Perhaps it is that the Atlantic salmon is not just an expression of the life force but a symbol of it as well. The plight of planet Earth is mirrored in the plight of salmon.

Focus on a shoal of Atlantics shimmering through

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the icy currents of the Davis Strait. Here is a meeting and melding of life from thousands of watersheds segmented by oceans, mountains and human politics. One boat from one nation sets its gill nets within sight of the bright Greenland coast. That night the salmon of a dozen nations die in the nets, among them an entire run from a troubled Canadian river.

The diminished shoal continues, splits, and the two segments orient by some unknown natural beacon, one toward Europe, the other toward the coast of North America. On the European side Ireland takes fish from the United Kingdom, the United Kingdom takes fish from France and France takes fish from Spain. Meanwhile, in the western Atlantic off North America, Canada takes fish from the United States.

In the restless North Atlantic, the halved shoal shrinks quickly now as the cod fishermen catch salmon "by accident" and the surviving fish drop out to filter into the fast water veins of Labrador or swing south toward Quebec, New Brunswick, New England and Nova Scotia.

In the brackish interface between the Atlantic and the Penobscot River, several dozen salmon mill about, reprogramming themselves for freshwater, scenting out their natal tributaries and overcoming their reaction to Man's organic wastes, chemical effluence and toxic metals.

The little group holds in the Bangor Pool until a fifth of the fish are killed by anglers, then, with the first rain, moves upcurrent to Veazie and holds again. Here, anglers again reduce it by a fifth. More rain, and the fish press upriver into the big Maine woods that swallow wardens and shelter poachers, past weighted treble hooks, under lanterns and gigs that strike like giant heron beaks.

After finning in their shadowy lies through the long, tepid summer, the one remaining pair of fish moves into a nameless tributary that cuts a steep course through shallow bedrock.

Now the fish are lean and dark, their scales anchored tightly in their thickened hides. The lower jaw of the cockfish has lengthened and curved into a menacing hook. The flanks of the hen are stretched over bulging roe. Now, as night winds freshen from the north and the Earth cools and slouches from the sun, the pair takes a position in a pool below a gravel bar. In the wane of the rutting moon the cockfish prods the hen with his snout, and at length she glides up and over the gravel. Here, she turns on her side and, poising at an angle to the flow, violently fans the gravel with her tail. She repeats this until she has excavated a circular depression in the gravel. With the cockfish at her side she crouches over the bed. Both salmon open their mouths and, shuddering, release their eggs and milt simultaneously. Now the cockfish moves away, and the hen edges upstream to cut another redd, thus burying the first.

The eggs are there, this instant, a promise hidden in the gravel, a promise for a brook, a river, a people and a planet. They are a visible connection between unmolested land, clean air, healthy lakes and rivers and the responsible, shared stewardship of the seas. In them is a little of whatever it is that still holds the living Earth together.

On Connecticut River, biologists put salmon in handling bag to carry it over dam blocking its path.

Biologist releases hatchery-reared smolts into a Vermont river so they may begin their trip to the sea.

By Victor Cohn

Sister Kenny's fierce fight for better polio care

She was obstinate and not open about her own background, but she nevertheless was responsible for a revolution in medicine

In the year 1911 a young woman rode into the Australian Never-Never, the lonely Outback, to create a revolution almost unprecedented in medical history. In the long decades before a polio vaccine—in an era when the very word "polio" struck terror in parents—she was about to discover a treatment that would eventually revolutionize polio care.

With these means she would prevent untold crippling and suffering. She would also help create a new field of medicine—rehabilitation—with an aggressive approach toward all disability. Her aggressiveness here still would be timely today. For too many disabled persons—the victims of accidents, strokes and other disorders—still are left to sit and waste away.

This bold woman was Sister Elizabeth Kenny, no nun but a "nursing sister" in British parlance. Sister Kenny would spend a lifetime fighting: fighting doctors, the Establishment, men (who *were* the Establishment) and herself, for she was no simple, sweet angel of mercy but a complex, angry creature.

Sister Kenny reminded us that in every time science has its dogmas, and it sometimes takes a rebel to state a new truth. She made us remember that the Establishment is not always right.

Like a Freud or a Kepler, she helped open our minds. Doing this—doing it flamboyantly and tartly, once telling eight doctors carrying roses, "It is very gratifying to receive flowers from doctors while I am still here to smell them!"—she became so famous that for ten straight years American women, polled by George Gallup, named her second among women they most admired, next to Eleanor Roosevelt. In 1952, shortly before her death, she was named first.

She is a woman history should remember, yet she is almost forgotten. I was once almost ready to forget her myself, though as a medical reporter in Minneapolis I had covered and known her when she was almost worshiped. Americans in the 1940s and '50s besieged her wherever she went. In Washington in 1944 one newspaper reported: "More than a thousand parents of crippled and cured children surged into the room. . . . Police tried vainly to hold them in check. . . . 'It's like watching a miracle,' a policeman whispered. . . . 'You can't keep them back.' "

Hollywood made a romanticized film, *Sister Kenny*, starring the late Rosalind Russell (p. 196). The press virtually canonized her, and after a time the myths

Don't Close That Door!
Washington Times-Herald cartoon urges backing Kenny, as, once again, she threatened to depart.

Sister Kenny in 1947 wears one of the Aussie-style hats and elaborate dresses she affected then.

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became cloying. I became tired of her and the medical arguments about her. Then she died and my editor sent me to Australia to write about her "early nursing years." That was a subject on which she had always been strangely reticent. I soon discovered why.

I found that this woman who had been widely honored as a nurse was no trained or registered nurse at all, but a mere country woman who bought herself a nurse's costume and went to work. She claimed to be a graduate of "St. Ursula's College," but in fact had only five or six years of schooling. She boldly talked her way into the Australian Army Nursing Service in World War I to win that title, "Sister"—like first lieutenant—which she would cling to for all of her life (p. 184).

When she came to America in 1940 and was represented as a woman who had "conquered" Australia, she had actually been more or less kicked out of her own land. Finally, I discovered, in that year when she would begin truly conquering America, she was not 52, as she claimed, but 59. This spectacle of an often weary woman starting over at an age when most of us are getting ready to quit, this new view of her as half Nightingale but also half P. T. Barnum—lying, laughing, cajoling, exploding sometimes in real fire and anger and sometimes in crocodile tears—this intrigued me.

Liza Kenny, here about 31, in her self-designed nurse's "uniform."

Applying heat to relieve pain

For beneath her scarred surface there was genius, "the faculty," as William James described it, "of perceiving in an unhabitual way." Young bush nurse Kenny saw the muscles of children with polio contracting in disabling pain. Where doctors saw crooked bodies that, they said, "had to be held straight" by casts or splints for days or weeks of actually harmful immobilization, she applied heat and relieved the pain. This simple observation grew into a system of treatment, the Kenny method, born out of the isolation and courage of her Australian frontier.

She was born in 1880 in the village of Warialda ("place of wild honey") in that still raw nation-continent. On her Irish father's meager holdings, young "Liza" saddled her own horse, rounded up cows and dreamed of better things. When she was 13, she broke her wrist and had to be taken to Toowoomba, on the rim of Australia's Great Dividing Range, to see *the* doctor there, surgeon Aeneas McDonnell. A few years later, worried about her frail brother, Willie,

Victor Cohn, science and medical reporter for the Washington Post, *has written a biography of Sister Kenny.*

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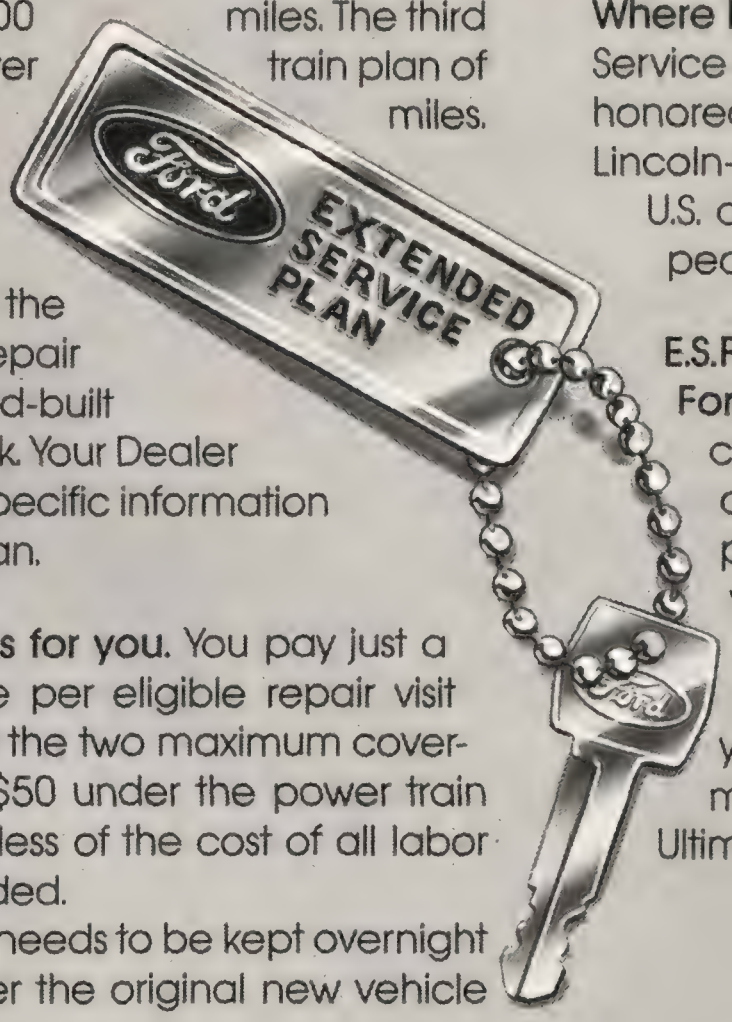

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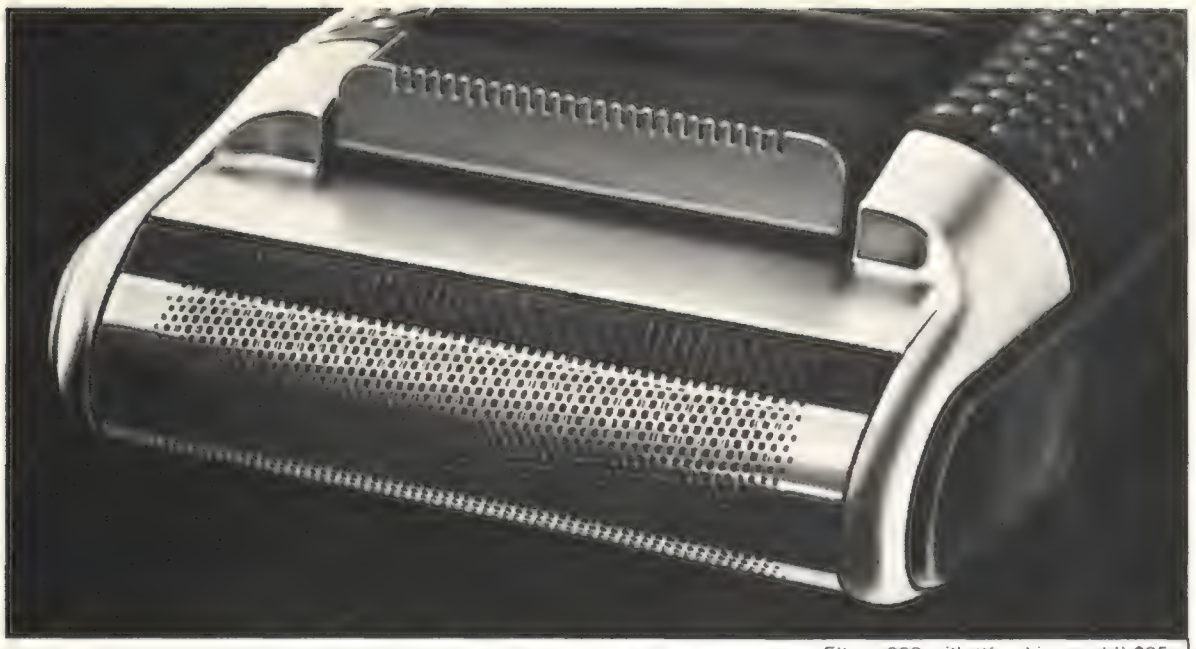

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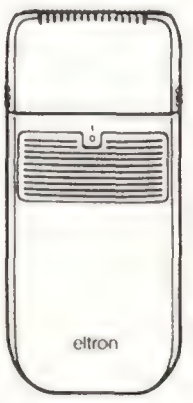

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she consulted McDonnell. He suggested exercises and lectured her on muscle structure. At an age when other girls were preoccupied with frills, she rigged up a wooden man with strings to show Willie how his muscles worked. Willie developed, and so did Liza.

She reached her twenties and tried a male pursuit: selling produce to big-city buyers. She did well, but when she walked down the street, some people turned away, for she had stooped to do a thing a woman was not supposed to do. "I was healthy and strong," she later said, in a day when a "lady" must "faint at will or lose consciousness at the sight of a drop of blood or a mouse."

She began staying with families to "help" when their babies came. She assisted a nurse who ran a maternity home. She learned some nursing and midwifery, and a doctor gave her a letter "certifying" her good work. She had a tailor make her a snow-white uniform, a velvet cap with a stiff crown, and, around her shoulders, a red silk nightingale, a little cape named for that great nurse,

In 1916, as Australian Army nurse, she finally won rank of Sister.

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At first Kenny Clinic in Townsville, Australia, she told nurses: "All suggestions of helplessness must be combated."

worn over a long velvet cape (p. 182). She showed up back home as Nurse Kenny. Her territory? The Dividing Range's hilly approaches and the wheat-and-cattle land of the Darling Downs, a then isolated Australian Montana. Doctors were few, and roads were mere wagon tracks. There were plenty of sick, so she just saddled up.

On a June day in 1911, Australian early winter, she was called to the bedside of a two-year-old girl. The sun was already setting when her horse reached the young Irish immigrant family's bark-roofed slab hut. The blonde child lay twisted in pain, with one elbow bent, one knee drawn up, and a foot turned grotesquely downward. The new nurse galloped to a telegraph shack to wire her friend, Dr. McDonnell. "Infantile paralysis," he replied. "No known treatment. Do the best you can with symptoms presenting themselves."

Infantile paralysis was still a "new" disease. A plague of civilization, it is caused by a virus so common that in primitive societies there is wide, mainly mild and unnoticed childhood infection, then immunity. With sanitation, the polio virus begins hitting later and harder. In the early years of the century, it was just striking forth.

Liza Kenny knew that heat relaxed sore muscles. She tried a bag of warm salt, then a warm linseed poultice. "Almost in desperation," she wrote later, "I seized" a blanket, "tore it into strips . . . poured boiling water over them" and wrung out the water. She wrapped the hot, damp, pungent wool around the tortured limbs, "and in a moment the child stopped whimpering."

She did this throughout the night and next day. Then, ignorant of textbook warnings, she began moving the child's now relaxed limbs in normal patterns. She soon found herself doing the same with six more children. The sight would have chilled eminent orthopedists. It chilled Dr. McDonnell when she demonstrated later on an affected boy at his hospital. He sternly told her that in polio's acute stage, the muscles were "flaccid" and sagging and pulled out of shape by adjoining strong muscles.

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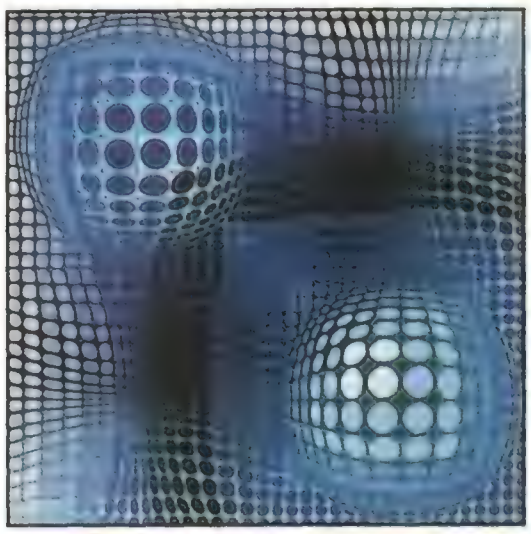

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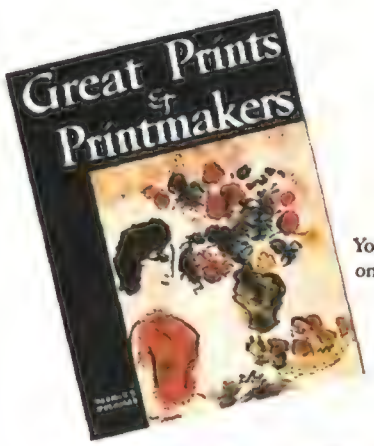

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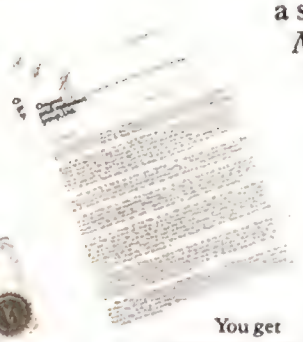

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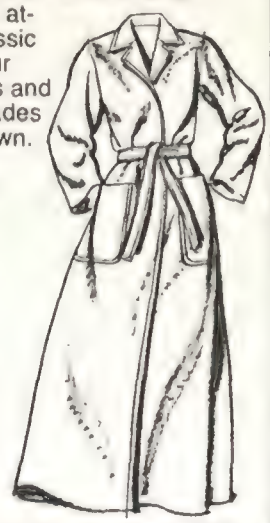

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Therefore they must be held straight. The muscles might then atrophy for lack of innervation by the nerve cells that polio had shriveled, but they could later be supported by braces.

She said *she* saw muscle spasm and tightness, not flaccidity, distorting limbs. She told, too, how she had retaught patients "forgotten" movements. McDonnell thought she may have seen some unusual cases. But he encouraged her to keep experimenting. A modern doctor would have called her application of heat followed by graded exercise "physical medicine and rehabilitation." In 1911 and, as it turned out, for three decades to follow there would be general fear of harming "fragile" polio-stricken muscles by such "premature" motion.

Nurse Kenny started her own country hospital, and World War I came. Still lacking real certification, the Australian Army Nurse Corps' requirement, she booked private passage for London bearing her own "credentials," a letter from Dr. Mc-

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At San Francisco in 1944, Sister Kenny demonstrates for doctors and nurses how, in her method, leg muscles must be flexed.

Donnell. Wounded Aussies were being returned by the shiploads from Gallipoli, and the hard-pressed Army tried her, then gave her its neat gray uniform, with red shoulder tabs and a cape with red lining.

She served in Belgium and was wounded in the leg by shellfire. She spent the next three years crisscrossing the oceans on "dark ships," ill-armed Aussie troop and hospital vessels. After one voyage, according to a Sydney newspaper, "the story ran through the ship of a soldier shot through the shoulders and completely paralyzed in both arms, who, through some treatment by a sister" —our Kenny—had been "able to carry off his pack at Melbourne." She was soon given the most disabled patients. "Ken had great ideas of her ability," said a nurse buddy. "She'd be quite certain that if nobody else could do something, she could." And she was never afraid to argue with the average nurse's deity, the doctor.

After the war, she returned to her bush nursing. She taught a girl with cerebral palsy to walk with a cane and eventually care for her own home and family. Forced to convey an injured girl 30 miles over dirt tracks to a hospital, Nurse Kenny remembered soldiers dying of shock on jarring ambulance rides. She quickly converted the heavy door of a linen cupboard into a stable stretcher for the girl. Inspired, she designed a patent stretcher for rough country roads, and it brought her some income.

Not until 1931 did she get her hands on another polio patient. A young woman crippled eight years earlier, Maude Rollinson could drag herself only a few steps on crutches. Both legs were paralyzed and one was withered. Some nerves and muscles might still be alive, Liza felt. She spent weeks working with Maude, giving her exercise and hot, then cold, contrast baths to improve muscle tone. "Some of your cells are dead," she told Maude, "but some are dormant. . . . We have to reeducate them."

After three months, Maude could

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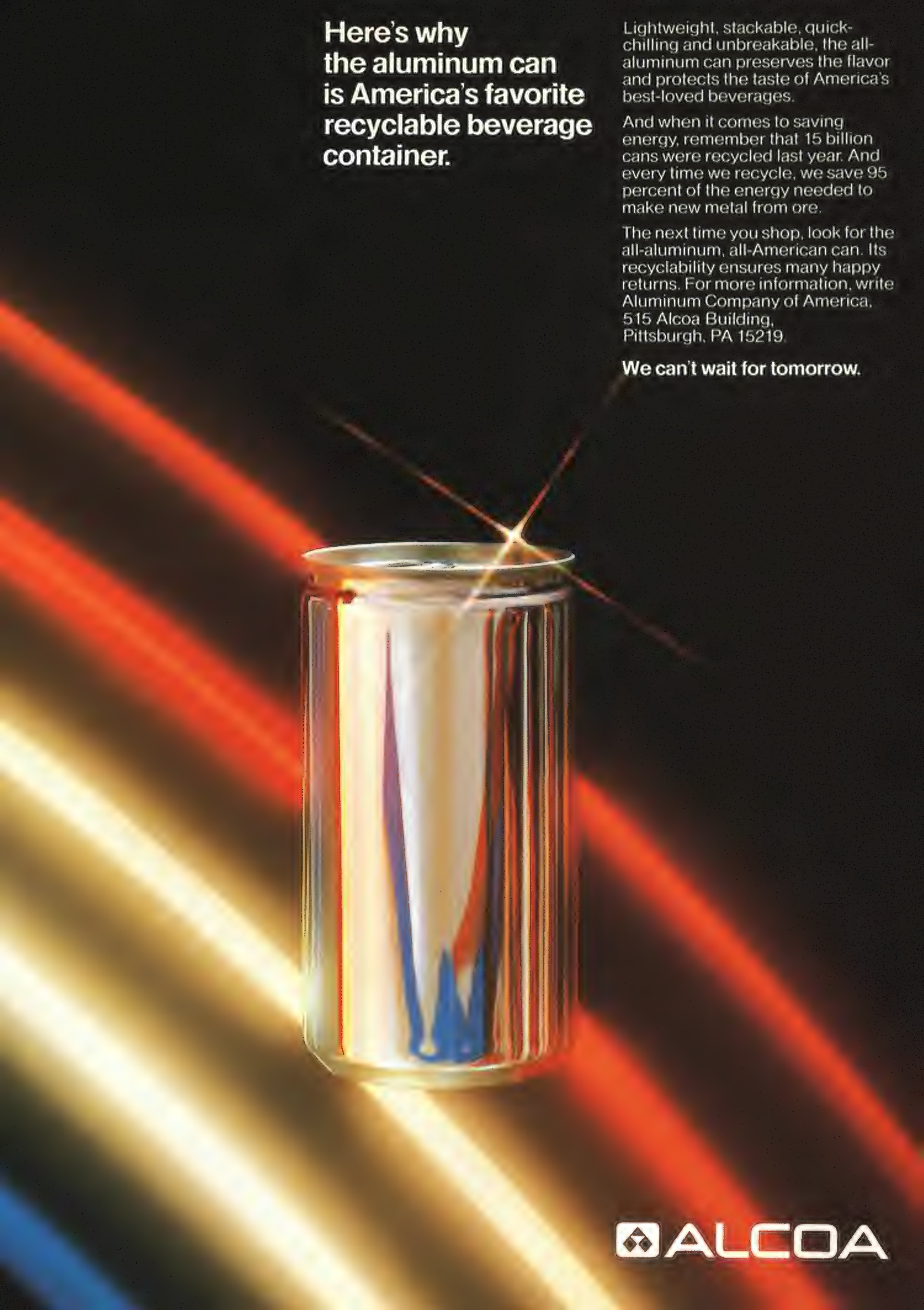

ALCOA

walk slowly with a light stick. Before long the ex-war nurse had 17 patients, some with old polio disabilities, some with cerebral palsy. She made progress with some, but she was still experimenting and often showed her medical ignorance. A few doctors corrected her or gave her tips. One later heard her blandly repeat all his ideas as her own. "She's an old fox," he said.

This happened for years. She had "a mind like blotting paper," another doctor said. She was still a half-educated countrywoman in baggy dresses, but she had good eyes and ears and sometimes good political sense. She told Queensland government officials—Labour, antidoctor—that she was restoring medicine's rejects and the government should support her. In early 1934 the first official Elizabeth Kenny Clinic was opened in Townsville in the tropical north (p. 186), and in June a second in Brisbane, the capital of Queensland.

At the White House in 1943 with President Roosevelt and Basil O'Connor, head of the March of Dimes, with whom she later broke.

She dressed her new nurses in sky-blue veils and trained them as therapists. "All suggestions of future helplessness must be vigorously combated," she told them. Some doctors and officials opposed "wasting" money on any patients who might never hold jobs and pay taxes. Ahead of her time, she said every patient should be trained to his full potential, be it only self-care.

Battling the medical establishment, which still preached immo-

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bilization by splinting, battling officials who wanted to put someone, always a man, in charge of her—"Men!" she said, "I won't let any man boss me"—she saw additional Kenny clinics established for a time in Sydney, Newcastle, Melbourne, Cairns, Rockhampton and Toowoomba. In 1939, however, a Royal Commission said she had made claims she could not fulfill. It said that immobilization for three weeks was essential for polio victims, and her abandonment of it would cause "a harvest of spinal deformities."

A Kenny ward was opened at Brisbane General Hospital nonetheless. This was her first chance to work with any large number of fresh patients, instead of the old victims with long-frozen muscles. Fewer deformities showed up in her new patients, yet most doctors said, "They must be light cases."

A few were impressed. One was Jarvis Nye, one of the Royal Commissioners. He knew she had been wrong in case after case that the commission saw. But now he saw a more mature Kenny. Some time earlier, he had examined a girl with a paralyzed deltoid, the large shoulder muscle, and shoulder girdle. Her parents were taking her to Sister Kenny. Her orthopedist asked Nye to prevent it, saying, "If this poor kid is not splinted, her arm and shoulder are going to be ruined." Nye saw the girl again after Kenny treatment. She was normal.

No avail. There were more such cases, but with World War II, attention dwindled. Six doctors and medical professors led by Nye signed a statement saying Sister Kenny had made "an important contribution," and Nye told his friend and patient, Queensland Premier William Forgan Smith, that she should be sent to America. "Bloody good riddance," Forgan Smith told a friend.

In April 1940 she stepped off a boat in San Francisco. No baggy dress today. Here was a solid-looking woman in a businesslike black suit and a sweeping black hat with a feather, topping a strong face and jutting jaw. Over the coming months she would scrutinize American polio treatment. More splints and casts. "Plaster prisons!" she scoffed. "The kiddies look like they're crucified." There were a few exceptions. In some centers, the casts were removed once or twice a day after the acute period of a few weeks, and limbs were moved passively a little. In others, even this timid motion was forbidden. Many needlessly useless limbs, crooked spines, tilted pelvises and crippled bodies resulted.

But she was arriving at just the right time. Every summer was polio season and frightened parents kept children at home—no swimming, no movies, no parties. Franklin D. Roosevelt, a President paralyzed by the disease, had founded the National Foundation for Infantile Paralysis (now the March of Dimes Birth Defects Foundation) and there

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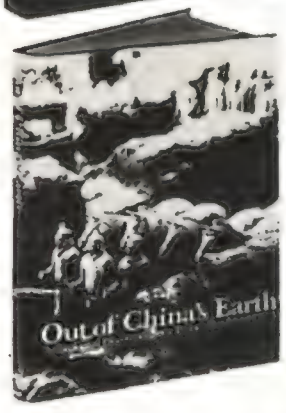

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were annual President's Birthday Balls to raise money. Still, Dr. Kristian G. Hansson of Cornell Medical College wrote on the eve of Kenny's arrival: "No specific treatment" exists for acute polio and in the face of epidemics there is "helplessness."

She vainly offered her solution in New York and Chicago. She offered it finally at the Mayo Clinic in Rochester, Minnesota, where a few interested specialists told her of some recent cases and possibly receptive physicians in Minneapolis, 75 miles north. Indeed so. One, Dr. John F. Pohl, later remembered: "Our city hospital was just crowded with polio. And treatment, in plain language, was just no damned good, [with] little kids lying stiff and rigid, crying with pain even though, as she saw, they were not necessarily paralyzed. We'd take children to the operating room . . . straighten them out under anesthetic and put them in plaster casts. When they woke up, they screamed. Sister Kenny said 'That's all wrong.'"

Muscle spasms, not paralysis

She demonstrated for Dr. Wallace H. Cole, then the tough-minded orthopedics chief at the University of Minnesota. She saw a two-year-old boy with one foot badly dropped, toes down, heel up, and the other foot in extreme dorsiflexion, toes up. "These conditions are not caused by paralysis. They're caused by spasms," she announced. She and an adopted daughter, Mary Stewart-Kenny, relaxed the taut muscles with hot packs, then gently moved the boy's legs, watching for muscle tendons to stand out. When one did, they knew the muscle attached to it would function. And they kept working.

In this way, she and Mary corrected the boy's deformities in three days. She also aroused live but dormant muscles in a boy with a stiff arm and deformed spine, immobilized for five months. "Miracles!" said many watchers. Cole just said, "I think

you'd better stick around for a while." She and her helper began working in earnest. Some "miracles," yes—a term she abhorred—but most patients would need treatment for months.

Most of polio's problems, she maintained, were caused not by cell death and irreversible paralysis, though these sadly existed, but by three often stubborn phenomena: *spasm*, that is, muscle tightness and shortening, causing pain and tension, distorting the skeleton; *mental alienation*, or inability to move a muscle, though nerve paths were intact; and *incoordination*, or helpless reliance on the wrong muscles. She said inactivity caused equal damage.

By now a tried practitioner

She was given a ward at Minneapolis General Hospital and, for the first time, ungrudging help from several doctors and nurses. This was not the old Kenny but a tried practitioner, able to use her latest knowledge. She put on a long, white hospital gown and bent over a child. First came repeated hot packing. Then, passive limb movements—movements by the therapist, not the still helpless patient—to produce "mental awareness" and "tendon stimulation."

Then, perhaps after days, the aging nurse—60 that fall, though she didn't admit it—might feel a slight pull against her as she moved a child's limb. A reflex, promising movement. Now she stroked the area over the affected muscle and said, "Think of it moving." Then, "You do it." Gradually came just a few muscle quivers, then real voluntary movement. Slowly, Kenny and her assistants retrained each muscle in normal, well-coordinated motion. Or, if real damage was too great, they taught the patient to use what remained as smoothly as possible.

"She handled a limb like a fine watchmaker handling a watch," said John Pohl, and another physician remarked: "I can't get anything out of her writings or lectures, but when

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In June 1941 Drs. Cole and Miland E. Knapp reported that her patients did far better than immobilized ones. In early December, after some pruning of Kenny opponents by FDR's law partner and friend, the often untherapy, nursing and civic groups and universities honored her. In 1950 a Joint Congressional resolution gave her the first lifetime visa-free passage across U.S. borders granted any foreign visitor, it was said at the time, since Lafayette.

But she was already fighting with doctors who were using what she regarded as generally inferior "modified Kenny" methods. She broke with Basil O'Connor and started her own Kenny Foundation and more clinics. She constantly threatened to leave the country, and sometimes did, temporarily. Any attack on her therapy—or an epidemic—brought her back. "I used to call her 'my old dreadnaught,'" one doctor said. "She always loved to fight. She would sail in with all guns firing."

Yet she was often her own enemy. Over the years, as screenwriter Dudley Nichols said, "She grew thorns, like a rosebush." Whenever she feared hostility, she scratched first. "She could be a saint one minute while treating a child, and two minutes later turn to a doctor and blister him," said a dismayed friend. She was invited to Buffalo by a doctor who had used her precepts to treat both his sons. A medical luminary was asked to show her his cases.

gentle Basil O'Connor (p. 192), a National Foundation for Infantile Paralysis committee stated unanimously that Kenny treatment was superior. The *Journal of the American Medical Association* simultaneously endorsed the new method, and foundation president O'Connor and AMA *Journal* editor Morris Fishbein, then medicine's leading spokesman, spoke on a coast-to-coast radio hookup.

"Sister Kenny has dropped a bombshell," said Dr. Edward L. Compere of Northwestern University. All over the country, many doctors and hospitals started switching methods. Dust accumulated on stockpiles of immobilization frames and splints and they were later sold for scrap.

On the front pages at last

Minneapolis established an Elizabeth Kenny Clinic, still operating today as the Sister Kenny Institute, a comprehensive rehabilitation center. Funded by the polio foundation, universities started Kenny training courses, then courses to increase the supply of rehabilitation therapists and doctors. They became invaluable as World War II began awakening medicine to the need for "rehab."

Sister Kenny's story hit the front pages. "There are few stranger and more romantic episodes in medicine," said Hearst's *American Weekly*. "You have to go back to the work of Pasteur and Lister and their trials and tribulations to find a parallel." Hollywood made its movie portraying her as pure angel, and at its première in 1946 traffic stopped as 20,000 people jammed into Times Square. Extra squads of police were unable to keep them under control, and there was a major uproar when Sister Kenny herself arrived.

She loved it. She took to wearing black satins and white brocades, a white caracul cape, opals and corsages, ever topped by a fantasy of a hat (she once said, "I'd look awful in a little hat—it would look like a pimple on a pumpkin"). Physical

A scene from the film; Miss Russell became a trustee of the Kenny Institute.

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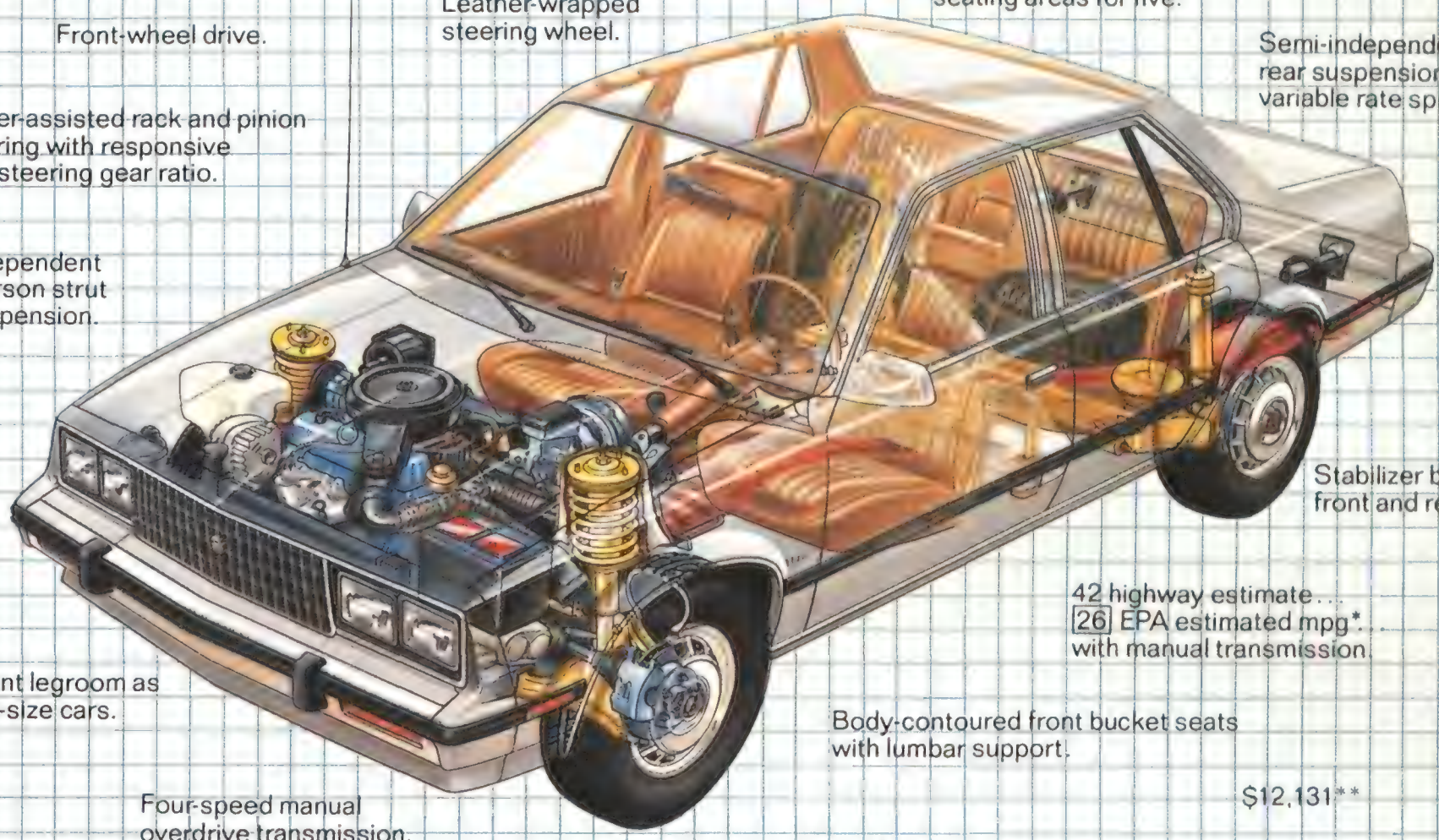

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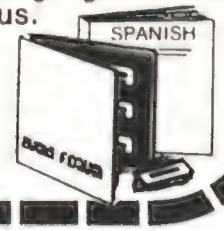

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"Can you teach me to wiggle my ears?" one male doctor shot out once. "It isn't necessary," she answered. "Any ass can do that." In anger, she said of "the doctors": "They have no mercy for the children of America. I have no mercy for *them*." But later, calmer: "I quite agree with the medical profession for their caution in not embracing new ideas, including my own, until they're satisfied they are effective. . . . They're wonderful men, most of them." On a trip to Australia, Dr. Thomas Victor Stubbs Brown, a courtly old foe, greeted her. "Will you trust me with your bag and its contents?" he asked. "Dr. Stubbs Brown," she replied tartly, "I would trust you with anything except a case of polio."

A major medical empiricist

At last she developed Parkinson's disease and its masklike mien. In 1951, she was forced to retire. Still restless, still dissatisfied, she lived out her life in Toowoomba, overlooking the hills and low peaks of the Great Dividing Range. On November 30, 1952, she died of a stroke.

Forgotten today? Not really. The Smithsonian's curator of medical history, Dr. Audrey B. Davis, recently described Sister Kenny as "a major 20th-century medical empiricist who successfully brought her effective techniques into the arsenal of medical theorists" and ranked her with Florence Nightingale and Clara Barton as women who had transformed medicine. Last year, asked why he has been so ardent about women's rights, actor-director Alan Alda told how he had been struck by polio as a child and treated by Kenny

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methods. "I might not have lived," he said, "and I certainly wouldn't have had the career I've had, if Sister Kenny had not done [several] things. She discovered something, she was inventive, she was exploratory—she was all those things that are supposed to be what men do. And, in order to contribute this to the world, she fought against sexism. If she hadn't won her battle against sexism, I'm just one of millions who might not be here today."

One doctor has summed up Elizabeth Kenny's medical contribution by saying that she helped end "a century of the abuse of rest." "What she taught," says another, "is what is widely taught today. You can do a great deal with what you have left."

Medical upstarts, the preachers against the accepted, are often, even usually, wrong. Yet authoritarianism, arrogance, self-righteousness and vanity all remain diseases of humanity, therefore diseases of science. Sister Kenny reminds us that we have to keep questioning.

Sister Kenny waves farewell as she leaves for London, en route to Australia. "My mission in America is completed," she said.

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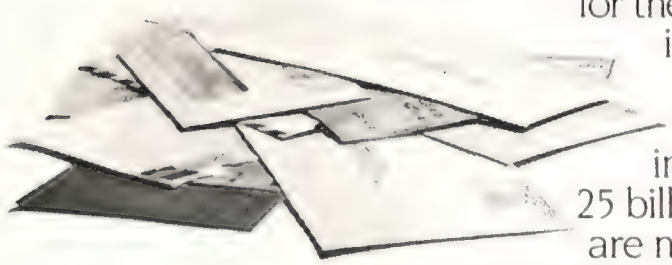

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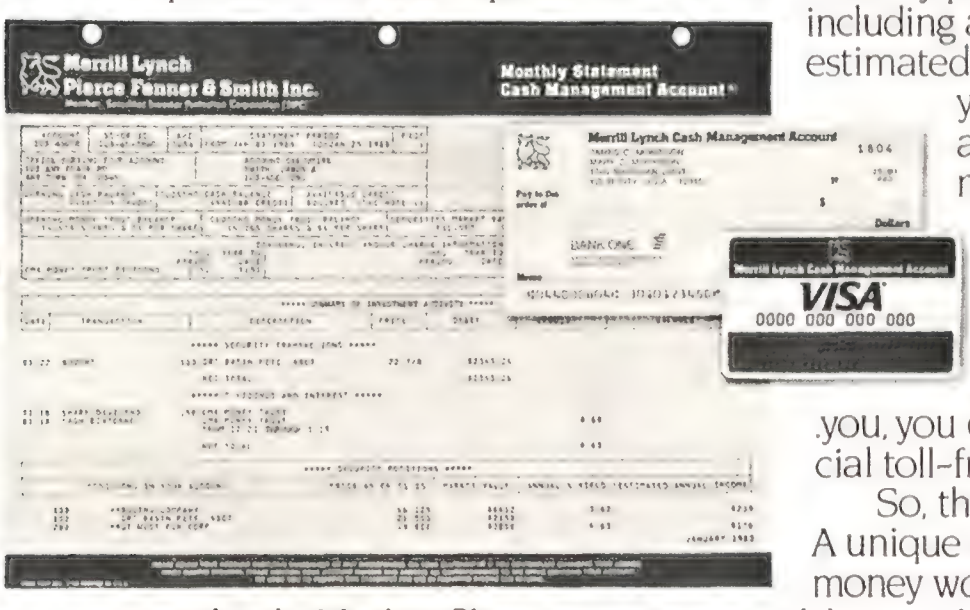

vacation in Mexico City, you spot a rare antique.

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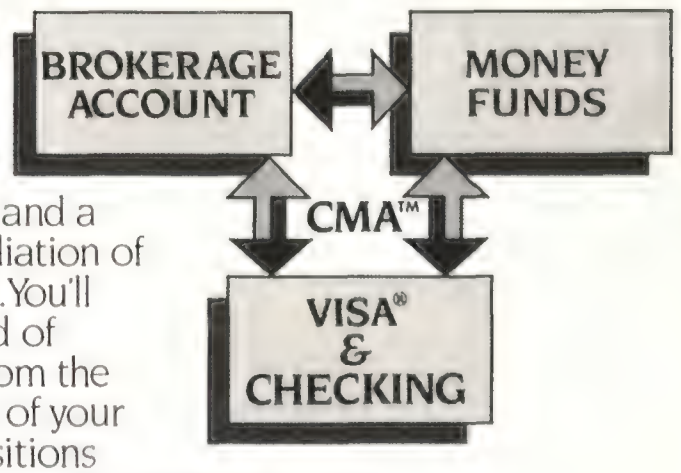

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By Leon Harris

What's what with America's *Who's Who*

For 82 years a book of names has inspired pride, envy and, invariably, humor; here's how they count the people who count

What do art dealer Daniel Wildenstein, ballerina Merrill Ashley, Federated Department Stores (Bloomingdale's, A & S, Filene's) president Howard Goldfeder, Philadelphia Museum of Art director Jean Boggs and *Who's Who in America* president Kenneth Petchenik have in common? Although each is at or near the very peak of his or her chosen field, not one of them appears in *Who's Who in America.*

Nor are these exceptions extraordinary and, therefore, insignificant. After Wildenstein, arguably the three most important art dealers in America are Rudolf G. Wunderlich (Kennedy Galleries), Leo Castelli and E. V. Thaw, but none is listed in *WWA,* although biographies of much less significant dealers appear there. Other top museum directors, the Frick's Everett Fahy and the Guggenheim's Thomas Messer are absent from *WWA* when undeniably less distinguished directors appear.

In fairness it should be admitted that *every* list—The Associated Press All-American football selection, the *Social Register,* the Ten Best Films of the Year—inevitably suffers from two things, who's left off who should be on and who's on who should not be. Even God (unless Moses was a poor stenographer) left off His list some sins rather more significant than coveting your neighbor's ox.

Some of the reasons that determine who gets into *WWA* and who does not may, like the peace of God, surpass human understanding. But the phrase "who's who" has become an idiom of the American language. A brief look at the history of *WWA* helps explain why.

In 1899, Albert Nelson Marquis published in Chicago the first *Who's Who in America,* admitting that it was a copy of the *Who's Who* already published in England for half a century. The oldest regularly published list of Continental noble or aristocratic persons, the *Almanach de Gotha,* was almost a century older. Britain's *Royal Blue Book* began in 1822 and Burke's *Peerage* and *Landed Gentry* in 1826 and 1837.

Although Mr. Marquis was unquestionably quirky, he and all his successors have run an honest wheel, adhering relentlessly to two rules: no one need buy the book to be in it; and no one can buy himself a listing. Even America's quintessential sceptic, H. L. Mencken, declared "all literate Americans know that admission to *Who's Who in America* costs the chosen nothing whatsoever, and cannot be bought by the heathen with gold and frankincense."

From the beginning Marquis insisted that achievement, not birth, was to be the criterion for listing. Those listed must be "reference worthy." And from the beginning, of course, his book was an irresistible target for cartoonists, from the comic pages to John Huehnergarth (opposite). As with most of us, Marquis' prejudices sometimes bent if they did not break his principles. Despite the obvious fact that in America, athletes are among the most "reference-worthy" citizens, he did not consider that they should be in *WWA* and, therefore, even Babe Ruth was never listed during his lifetime.

Mae West didn't make it

Marquis considered the advertising business "unsuitable" and anyone engaged in it was debarred from listing, along with convicted criminals. Today, however, cons and former cons such as Leroy Eldridge Cleaver and Timothy Leary continue to be listed if they have reference value. E. Howard Hunt includes "fed. prisoner 1973-74, 75-77" in his biography.

Marquis long refused to include Frank Lloyd Wright in *WWA* because of the architect's unsettled married life and perhaps because his work brought him too much publicity. When Mae West learned she had been barred from the big red book, she cooed coolly: "Well, the old boy who publishes that isn't in my little black book either."

So partial to "uplifters" was Marquis, according to Mencken, that the "fat red volume swarms with them. . . . Every officer of every missionary society between coast and coast seems to be on his roster."

There were 8,602 names in the first edition, or 1.15

Leon Harris may not have made Who's Who *but he is the author of* Merchant Princes.

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FROM NINE TO FIVE — by Jo Fischer

"It's a companion to *Who's Who*—for the ones who didn't get in."

per 10,000 of general population, and in the most recent edition (the 41st—1980-81) there are 73,500, or about 3 per 10,000. Three significant reasons account for the increase:

1) When Marquis began, many people refused to be listed because they thought it just another of the "mug books" then popular that charged $150 or so for inclusion, usually by requiring the purchase of a copy at that price. In the early days, many subjects refused to send back a biography, and editors had to devise various methods of handling the problem. When a woman author refused to fill out her British *Who's Who* form in 1897, editor Douglas Sladen did it for her, adding ten years to her age, and sent it to her for her approval. She sent it back forthwith, completed and corrected. When W. S. Gilbert refused, quite rudely, to fill out his form, Sladen characterized him as: "Writer of Verses and the libretti to Sir Arthur Sullivan's comic operas." Thereafter Gilbert filled out his form in great detail.

2) Americans who are automatically included—high government, military and naval figures, for example—now make up a larger percentage

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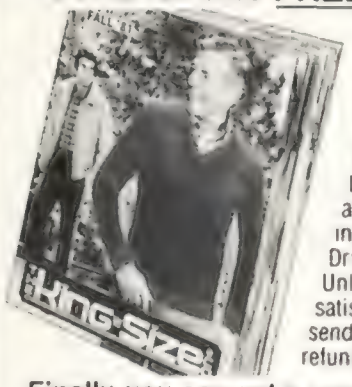

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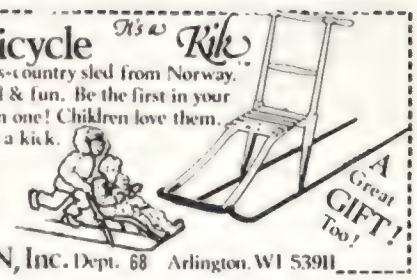

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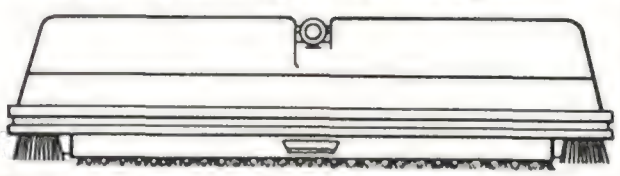

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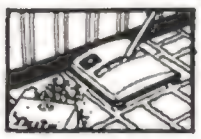

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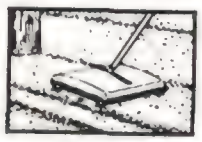

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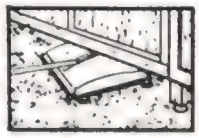

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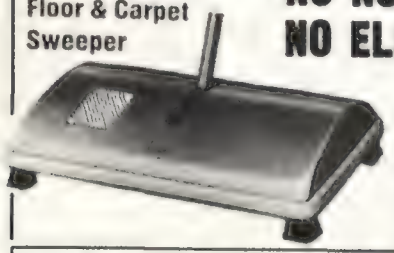

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of the population than at the turn of the century.

3) Eminence in many fields is now reached at an earlier age than it used to be and old people (prominent as well as ordinary) live and work longer.

Patently less prejudiced and more scholarly than was Marquis, Kenneth Petchenik now runs *WWA* for its present owner, the multibillion-dollar global conglomerate ITT. The short, soft-spoken, balding, longtime director of research at *The World Book Encyclopedia* disarms by his quiet candor a reporter who wonders whether allowing the listees to write their own biographies may not be foolish.

"Of course some subjects sometimes lie," admits Petchenik, "and of course we make errors. What listing of over 70,000 names wouldn't —except perhaps St. Peter's?"

Traditionally *WWA* has made its selections (and rejections) with its own employees. There are some 85 of these in a carefully anonymous, five-story building (no sign on the front or in the lobby) at 200 East Ohio Street in Chicago. This staff

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publishes not only *WWA* but also several dozen other directories.

The actual biographies are written by some 25 Chicago-area free-lancers, mostly women, who are paid on a piecework basis. But the selecting, to date, has been by the in-house staff. Currently they read four daily newspapers (*The New York Times, The Wall Street Journal, The Washington Post* and *Chicago Tribune*), five Sunday newspapers, and 90 specialized magazines and journals (*Variety, Sports Illustrated, Medical World News, Fortune, Advertising Age, Physics Today, The Chronicle of Higher Education, Opera News* and many professional directories).

"Their job is not so hard as you may think," explains Petchenik, who works in his oxford, button-down shirt and occasionally stresses a point with his round tortoiseshell eyeglasses. "Seventy-five percent of our entries are automatic or based on jobs. We absolutely automatically include the President, Vice President, all members of the Cabinet, Congress, the federal judiciary, ambassadors, active officers with the rank of major general or rear admiral or higher, mayors and city managers of principal cities, full professors at outstanding colleges, principals of business capitalized at or above a certain figure that I will not specify, leading lawyers and accountants and doctors.

"These people—bishops, publishers, top-ranking editors—are in what we call the 'titular category' and are automatically chosen because of incumbency and do not require our making any value judgments.

"Only about 25 percent of our choices are in what we call the 'achievemental category,' in which, except for important prizewinners (Peabody, Pulitzer, American Institute of Architects) whom we include automatically, *we* must make the judgment as to which individuals' achievements in business and the arts and sciences make them important enough to include.

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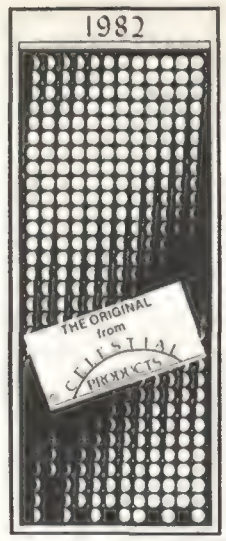

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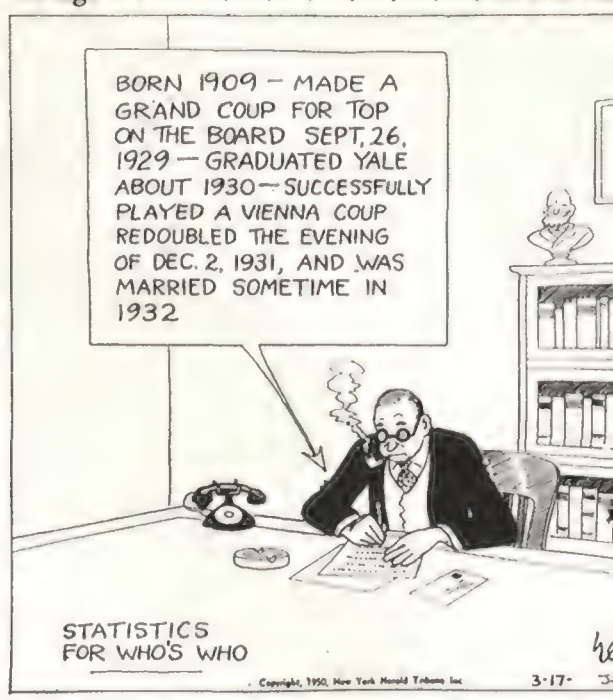
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STATISTICS FOR WHO'S WHO
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3-17-

Famed cartoonist H. T. Webster included this in his series on the bridge fad.

"Our staff has done and is now doing an excellent job, given its enormity, but we are in the process of making a change that will improve the job. We are putting together—like the DAB (*Dictionary of American Biography*)—a committee of authorities, expert professional advisers, in some 50 fields. Each of these outside men and women—recognized leaders in each field—will not only suggest listees but also probable future listees, names to file and watch for. But of course the final choice, the ultimate responsibility as to whom to include . . . will remain with *us*."

In recent editions, 12,500 to 13,500 new names (about 18 percent) have been added and an equal number "delisted" or "deselected" because of death or because they are no longer newsworthy. With each new list come new opportunities for tireless *WWA* critics (often not listed themselves) to poke fun.

WWA is far more diligent in making way for the new by weeding out passé names than is the British *Who's Who*, whose far easier practice is only to delist when a subject dies. (There are other differences, too. The British *Who's Who*, unlike *WWA*, has

a classification called "Recreation" under which the late George Bernard Shaw listed "showing off.")

During the preparation of each new edition, several hundred chosen subjects refuse to return a biography form to *WWA*. The editors then determine whether the person is so important that a biography must nevertheless be included and the necessary research be done to write it. All such biographies (Jerome David Salinger, Alexander Solzhenitsyn and, not very surprisingly, Greta Garbo) are followed by an asterisk.

A more impressive example of modesty is Thomas Alva Edison's. In the first volume of *WWA*, he identified himself as an "electrician." But vanity has always been more evident than modesty in these autobiographical bids for immortality. For many years Buckminster Fuller included virtually everything except his grade school report cards until his 1974-75 bio reached 139 lines. Petchenik's staff has now pared this to 80. This is well below the 92 lines that painter Helen Frankenthaler awards herself. By way of bench mark, Einstein had 27 lines.

Presumably *WWA* president Petchenik could award himself the longest sketch of the lot but instead he has none at all. Perhaps this is so that he may say to those who complain that they're not in the book, "Well, neither am I."

But there is in *WWA* a bio for one "Edward Petchenik, surgeon" listing his wife, degrees, clubs and home address. Is he the *WWA* editor's father, son, cousin? In fact, Edward Petchenik is a fake—he doesn't exist. He is one of several dozen "traps"—that is, nonpersons whose sketches are entirely fictional but whose home address is that of a *WWA* employee. These traps inform *WWA* when someone for his own purposes has used a list of names for a mailing. There is, in fact, nothing *WWA* can do about it. Such plagiarism is not

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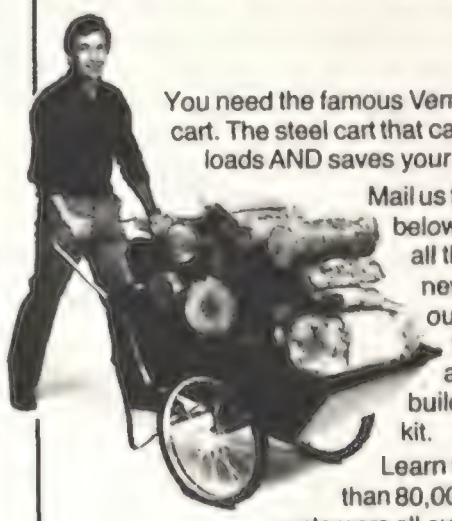

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Drawing by Saxon; © 1959 The New Yorker Magazine, Inc.

"Oh, it's no problem telling my wife I've been fired, but what am I going to say to 'Who's Who'?"

illegal. "We just want to be aware of it," confides Petchenik.

But as he never tires of pointing out: "We must rely on the honesty of *most* distinguished men and women and their fear of being caught. Imagine just the cost of making 73,000 telephone calls!"

Although women are said to be more carefully inaccurate about their correct age than men, *WWA*'s most interesting liars in this area are often men. Author/historian Henry Adams changed the date in his *WWA* biography so often that his younger brother found himself becoming an older brother—as he said, a "biological impossibility." Washington, D.C., bigwigs from Treasury Secretary Andrew Mellon to Senator Joseph McCarthy changed their birth dates in *WWA*. Other notables have generously awarded themselves fictional academic degrees.

But the widest variances in reporting and the angriest outrage have resulted from an institution as troublesome to Henry VIII as to Nelson Rockefeller: divorce. George Balanchine, the Bluebeard of the Ballet, in his current sketch lists none of his ex-wives except his last, Tanaquil LeClerq (whose name is misspelled in *WWA*). Maria Tallchief, Balanchine's fourth or fifth wife (depending on who's counting) returns the favor by not listing Mr. B. as one of her husbands. Songwriter Alan Jay Lerner lists 12 of his Broadway plays, eight of his screenplays, but not one of his

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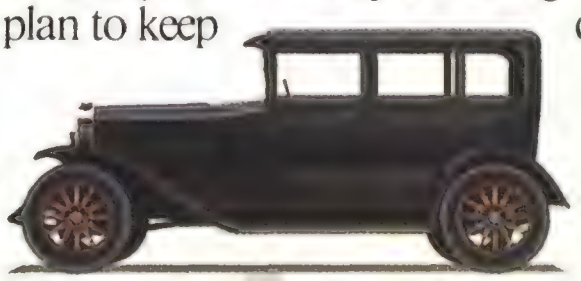

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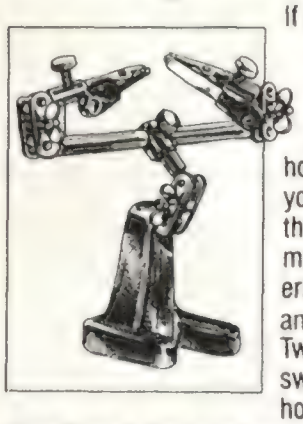

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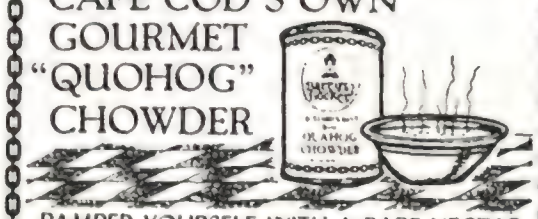

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eight wives. Mickey Rooney lists eight—all of his so far.

But for all its inevitable vanities, *WWA* is much more than an amusing look at the ego trips of some distinguished Americans. At the Chicago Public Library, it is the seventh most used reference—ahead of Webster's *New International Dictionary*.

In 1968, the Metropolitan Life Insurance Company published a 12-year study on longevity based on a one-sixth sample of all men over 45 included in the 1950-51 edition of *WWA* as against white men aged 45 and older in the general population. The artists and military men, lawyers and engineers, business executives and government officials listed in *WWA* lived distinctly longer, with scientists, educators and clergymen also showing low mortality rates.

Similar studies could be made concerning the brain drain from country to city and from state to state; the marriage rate; the divorce rate; the number of children per family; stated religious preferences; and which universities produce the greatest number of successful members of the various arts, sciences and professions.

WWA computer will allow a dog to find all Vermont veterinarians aged 50.

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A study of *WWA* and its changing makeup over the past 40 years shows professional changes (more doctors, but fewer artists and government employees—and, distressingly, only half as many authors); educational changes (in the first edition fewer than half the listees had graduated from college, now almost all have); economic changes; ethnic changes; religious changes (since the 1940-41 edition, clerics have fallen from seven percent to two percent of the listees, whereas business executives have risen from 17 percent to 27 percent or more than ten times as many as clerics); fashion changes (Smith is the most found surname; Charles, John, Robert and William, in that order, the most found male first names; no check of female first names has been thought useful); that listees seem to have fewer children than the general population. There have been changes in who has more and who has less power. Between the 1940-41 and 1980-81 editions the percentage of listees 60 and older in *WWA* fell from 54 percent to 46 percent, while the percentage between 30 and 50 rose from 16 percent to 22 percent.

All manner of folk in the business and professional world use *WWA* as a quick ready reference—executive head hunters looking for someone to fill a job opening, federal agencies seeking a fast rundown on a bidder for a contract, a client needing to check on a recommended lawyer/doctor/banker. If the name is not in the big red book, there are at least two strikes against it.

Therefore, a young person who knows what's what is very anxious to get in. A mere general letter of recommendation from an older associate already in *WWA* pointing out how bright and promising you are will result in a quick look, but no guarantee of admission. On the other hand, a letter from your senior partner (at Sullivan & Cromwell or Arthur Andersen & Company or the Cleveland Clinic) that is full of *specific detail*, such as the fact you are the youngest person ever taken in as a partner and that was because of the enclosed brilliant theoretical paper soon to be published in the leading trade journal—can get you in and so put you several lengths ahead of your young peers. It would be wrong to say

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The most important (and expensive) thing that *WWA* is doing right now under Petchenik's enlightened leadership is determining what information will be enclosed in its brand-new computerized data retrieval program, as well as how this information is to be made available to the public.

"We have not and will not sell lists because we think it would be unethical for us to do so," explains Petchenik. "There would be the obvious conflict of interest, since the more names we added, the more money we would get. But also we depend on people *giving* us something for nothing. They give us their information and time and effort and if we sold it, they might object. But as soon as we have finished encoding all the information in our next edition [the 42nd, 1982-83, two volumes, $109.50, available June 1982], we will have become infinitely more flexible.

"Without knowing any names at all, users will only need to ask the right question to get the names and addresses of all the veterinarians in Vermont who are listed in *WWA*, or

WWA's high standards prevent it from being tagged with Groucho's famous line.

all of them who went to the University of Minnesota School of Veterinary Medicine and are at least 50 years old and have been married at least three times."

The usefulness and profitability of such directories as *WWA* are proved not only by some 200 American peddlers of immortality—*WW in Alaskan Politics, WW Among Free Will Baptists, WW on the Postage Stamps of Bolivia, WW in the Zoo, WW in Chiropractic International* and *Who's Who of Horrors*—but all around the world—*Wer ist Wer* (Germany), *Qui Etes Vous* (France), *Kuka Kukin On* (Finland) and *Vem Är Det* in Sweden.

There are those who protest too much that they pay no attention to such lists. And there are those who care too much—*vide* the French chef who loses his three stars in *Michelin* and threatens suicide. And if you think you perceive a certain peevish undertone in this article, I want to make it plain, perfectly plain, that this has *nothing* to do with the fact that there are 130 persons of the surname Harris in the current *WWA* but I am not one of their august number. Nor am I in the least resentful—not a bit—not a damn bit.

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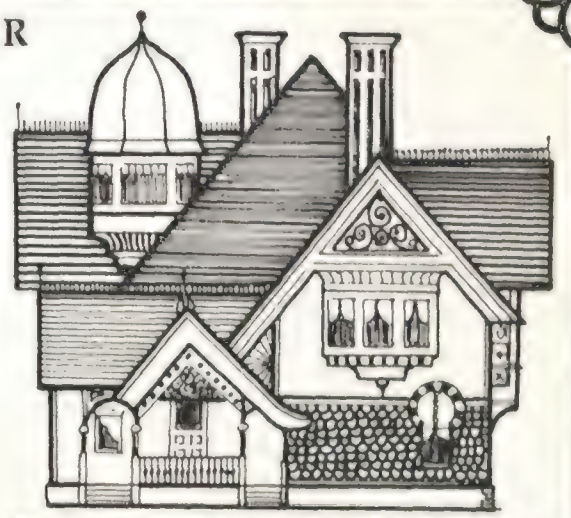

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Book reviews

Clifford Odets: American Playwright
Margaret Brenman-Gibson
Atheneum, $30

More than a stunning biography of a significant American artist, Margaret Brenman-Gibson's *Clifford Odets: American Playwright* is like a vast historical museum. An extraordinary amount of material is exhibited, yet, surprisingly, nothing seems superfluous. Every portrait, every artifact contributes to a unified, coherent history of Odets as well as of the American theater and of the times.

Dr. Brenman-Gibson, clinical professor in the Department of Psychiatry, Harvard Medical School at Cambridge Hospital, successfully bridges the cleavage between psychoanalytical case history and critical biography. Covering the years from 1906 to 1940, the present volume (to be followed by a second) is both massive and monumental. Its nearly 800 pages never flag, never fail to impress, if not overwhelm, the reader with their sensitivity to Odets' life story.

Dr. Brenman-Gibson opens with an account of Odets' death. Thus, in only a few pages, the reader receives a final portrait of this tormented, talented playwright, and in his end glimpses Odets' beginning. Here and throughout the book, details are never merely tangents; rather, they are clues leading to an understanding of the subject. Lying in the bed of a Hollywood hospital in 1963, dying of cancer, Odets is wracked by the waste and excess of his 57 years, by the specter of plays he never wrote. Feverish with activity, as if hoping to stave off death, he holds court to numerous visitors, telephones friends, plucks at his bouquets of flowers, outlines ideas for new plays and speculates on the meaning of life and death. As one of his last acts, he asks his psychoanalyst to marry him, a frantic suit "motivated by a wish to live and at the same time to leave a woman an imperishable legacy of guilt."

In the years this volume treats, Odets saw seven of his plays produced, beginning with *Waiting for Lefty* and *Awake and Sing!* and concluding with *Night Music*. These works Dr. Brenman-Gibson interprets as partial resolutions of Odets' own identity crisis and, in a larger sense, America's. Repeatedly Odets struggled to shake off the stranglehold of his corrupt father, who represented the crass values

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of big business, so that both Odets and America could awake and sing. Like the pugilist violinist in *Golden Boy*, Odets felt he could choose either to make a bundle—Hollywood beckoned with temptations of fame and wealth—or to nurture his gifts by writing serious plays.

Because Odets needed money—he gave thousands to his family and friends, to the Group Theatre—he flirted sporadically with Hollywood in the Thirties. He never forgot, however, that he had been hailed as America's most promising dramatist. Considered by many the most likely successor to Eugene O'Neill, Odets, nonetheless, failed to fulfill his magnificent potential. Intolerably vulnerable to criticism, Odets fumed when plays like *Paradise Lost* and *Rocket to the Moon* were panned. According to Luther Adler, he once exploded: "I'm *not* a genius. I can't write like a genius. With these reviews, they're driving me out of the theatre. Whatever I do is not good enough for them. They want . . . a masterpiece!"

Whether *Waiting for Lefty, Awake and Sing!* and *Golden Boy* are masterpieces is, of course, still open to debate. What is undisputed is that Odets created some of the most electrifying scenes in the history of the American stage and that his radical stance spoke for a dissatisfied generation. Even Odets' failures spoke eloquently of an America that never fully attained its lofty ideals. Two years before his death, Odets himself wrote: "I may well be not only the foremost playwright manqué of our time but of all time. I do not believe a dozen playwrights in history had my natural endowment. . . ."

It is not hyperbolic to say that Dr. Brenman-Gibson's biography teems with insight. A longtime friend of Odets, she discusses every detail of Odets' life—his early ennui and despair, his lifelong love of music, his early rejection by his mother, his ambivalence toward his father, and his need for the Group Theatre, without which he claimed he would never have written. Yet, Dr. Brenman-Gibson never loses sight of her overall plan: to present an intimate and complete portrait of Odets against the background of the age.

The supporting cast in the drama of Odets' life is also vividly realized: Lou Odets, the playwright's father, is arrogant, hypocritical and cruel; Pearl, the mother, is submissive and long-suffering; the actress Luise Rainer, Odets' first wife,

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In a typically Whitmanesque vein, Odets once boasted, "I will reveal America to itself by revealing myself to myself." Taking Odets at his word, Dr. Brenman-Gibson has extended this claim. In her extraordinary book, she has revealed both Odets and an America that his life and plays encapsulate.

Paul Piazza
Washington critic

"A Good Poor Man's Wife": Being a Chronicle of Harriet Hanson Robinson and Her Family in Nineteenth Century New England
Claudia L. Bushman
University Press of New England
Hanover, New Hampshire, $18

Beset by hard times, Harriet Hanson Robinson consoled herself that she was a "good poor man's wife," able to make do with very little. Not that the Robinsons were poor in the rock-hard way that urban Irish and many rural Yankees who also lived in Middlesex County, Massachusetts, were poor, but poor nevertheless. The real poverty that gnawed at Harriet throughout her long life was the want of scope for her ambitions.

Harriet was born in 1825 and nurtured on the shibboleths of upward mobility—"Improve your mind, try and be somebody." Her mother predicted that she "would defy the universe." She raised a family, wrote six books and became a leader in the women's suffrage movement. She died in 1911, a much-admired person in her community. But her life and work were soon relegated to footnotes in local histories and one-liners in family obituaries, identifying her as her husband's wife.

Harriet's quest for recognition is the backdrop against which Claudia Bushman recounts more than a hundred years of Robinson family history, drawing on diaries and scrapbooks left by Harriet and her daughter Hattie. Their intimate group biography in turn provides the context for a social history that ranges over working conditions, education, religion, medical practices, housekeeping and

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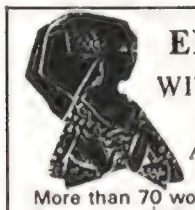

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child rearing in 19th-century New England, and goes on to deal with the fine points of Massachusetts politics and women's suffrage.

Harriet's father died when she was only six; by the time she was ten, she was employed in the textile mills at Lowell where her mother kept a boardinghouse. She managed two years of secondary education, read her way through the lending library, studied languages, attended lectures, wrote poetry and eventually worked her way into a skilled job at the mill. Writing half a century later, she would

Harriet Robinson, about 1843

describe her experience as a mill girl as "wholesome and educational."

At 23 she left the mill to marry William Robinson, an idealistic newspaperman whose unsteady career was thereafter to hold center stage in the family drama. Their household grew to include four children while Harriet's literary aspirations took a backseat to her role as wife and mother, which she considered at once an art and her natural vocation.

A woman, Harriet conceded in her journal, could never realize her potential outside marriage. Put another way: marriage was the price she paid for personal development. But Harriet only came into her own with widowhood, when at the age of 51 she embarked seriously on a career as a writer. Both for the sake of his memory and for the income it would provide, she wrote her husband's biography and compiled a selection of his articles in a

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For some years, Harriet had been a spokesperson for the radical wing of the women's suffrage movement led by Susan B. Anthony, and she would write the history of its Massachusetts branch. Mother and daughter Hattie subsequently broke with the movement over what they believed was Miss Anthony's lack of recognition of their efforts on its behalf.

Harriet surely possessed the talent and the drive to "be somebody." What might she have done with something like the material security enjoyed by her contemporary, Emily Dickinson, at Amherst? Harriet probably wouldn't have written any better poetry, but she might possibly have carved a bigger niche for herself in the history of her generation.

One foresees "*A Good Poor Man's Wife*" being recommended for reading in college courses in American social history and women's studies. It is a scholarly study, well organized topically, and Harriet and her family, after all, did things worth learning about, making small marks on great events. Only when this sensitively and, in portions, very beautifully written book is finished and put aside does the reader realize that what sustained interest in it was not the great events at all, but the everyday ordinariness of family life recorded in Harriet's diary. One still cares about the Robinsons as individuals and as a family. What finer way for Harriet Robinson finally to have won recognition?

Robert Rinehart
The American University

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Polly Burroughs
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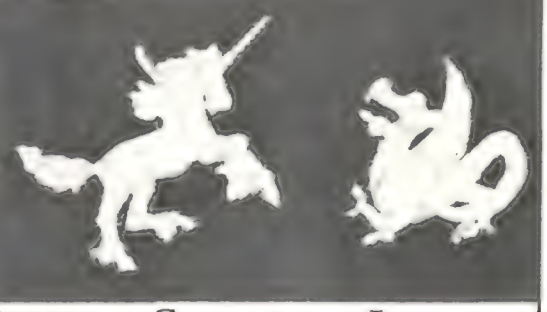

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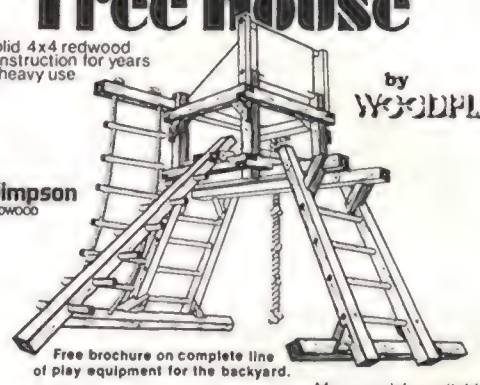

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The Taste of the Holidays
During the holidays, the kitchen is the heart of our Sonoma Valley home. Here, the marriage of wine and food fills the air with wonderful aromas and memories of vintages past.
This year, I have asked my mother, Sylvia, and my wife, Vicki to share some of their holiday recipes with our friends.
If you will drop me a note at the address below, I will be happy to send these to you.
From my family to your family . . . Buon Natale!
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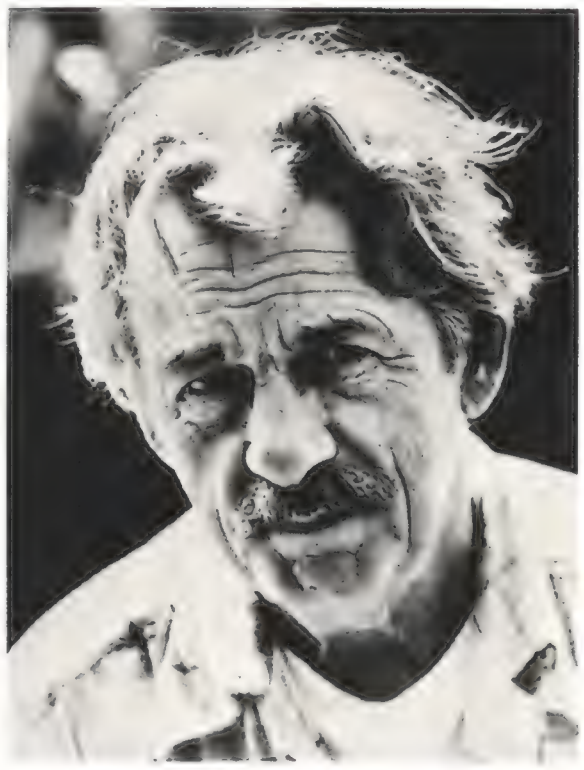
museum people "bores and boobs." He got his paintings into Hollywood movies and, just before he died at age 85 after completing his mural for the Nashville Music Foundation, television discovered him with a *60 Minutes* interview. To set the record straight as he saw it, Benton revised his 1937 autobiography *An Artist in America* twice, once in 1951 and again in 1968.

For all the hoopla surrounding his career, however, the "common man" behind Benton's media image remained obscured—largely intentionally, one suspects. True to the pragmatic American heroes he portrayed, Benton was a man who scorned emotional displays as much as he relished political diatribes. The one place where he felt at ease to tap the emotional wellsprings that fed his art was Martha's Vineyard, the island off the Massachusetts coast.

Starting in 1920, Benton, his family and friends returned to the Vineyard every summer for 55 years. It was there that he acknowledged his own strong ties with the earth, developed his theories about art and the common man, and painted his first breakthrough works. What he found there and how he lived at Martha's Vineyard are at the heart of *Thomas Hart Benton: A Portrait* by Polly Burroughs, Benton's neighbor and friend.

Miss Burroughs fashions Benton's portrait from a lively collection of neighborly anecdotes as natural and unadorned as the subjects of Benton's paintings them-



Benton in 1969, by Alfred Eisenstaedt

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The Federal Railroad Administration record shows nearly a 25 percent decrease in railroad accidents and a drop of almost 15 percent in injuries over the last three years. In the 15 years from 1966-80, railroad fatalities declined by 60 percent, but the most dramatic decline has been in rail-highway grade crossing fatalities. In the same 15-year period, these declined by 66 percent. In fact, there were fewer grade crossing fatalities in 1980 than in any year since these statistics were first recorded in 1920. And, this decline occurred despite vastly increased motor vehicle use and heavier rail traffic.

"Hazardous materials" transportation is the category most people think of immediately in relation to railroad safety. The number of fatalities in this category is extremely low—so low that the risk of being killed by lightning is greater. There were no rail fatalities in hazardous materials transportation in 1979; there were two in 1980.

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In addition, thousands of hours are devoted to intensive safety and accident prevention programs for railroad employees and the public.

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JOHN

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Pride for the Whitehall is not limited to the staff. Recently, readers of the *Chicago Tribune* voted it the best small hotel in Chicago. Not because it is grand and showy, but because it is amiable and comfortable. And not because it has a staff of thousands, but because it has individuals like John Christensen who are proud to serve individuals.

HIS WHISTLE

Very important to John Christensen, indeed to all the staff at the Whitehall, is greeting each guest by name and knowing what makes each one of them feel at home.

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selves. The book is not a psychobiography but, through the intimate details she recounts, a picture of Benton emerges that fills the outlines of his image with color. Her stream of interviews with old friends and neighbors reveals a man full of contradictions whose love of life matched his love of art, but who left the business of life building to others, his friends and, particularly, his extraordinary wife, Rita.

The artist first arrived on the island in 1920, accompanied by his wife-to-be Rita Piacenza and his lifelong friend, art critic Thomas Craven. They settled in Chilmark, then a primitive town on the western end of the island with only three indoor toilets, no electricity and only a few telephones.

Benton is described as a moody, insecure but talented young artist in that first summer on Martha's Vineyard. Son of a former Congressman from Missouri, Colonel Maecenas E. Benton, Benton was haunted by his father's disappointment over his following the unmanly profession of an artist. The author tells about the artist's unusually strong relationship with his mother, who left her husband to live near her eldest son and eventually moved to Martha's Vineyard, and the problems Benton had dealing with people. Anecdotes about his abrasiveness, his condescension toward women, his conflict with authority of any kind and his lifelong alcoholism characterize the early years on Martha's Vineyard.

But Benton's generosity toward and love of the simple folk of Chilmark and his close artist friends are the focus of the book. Through his friendships with the farmers and fishermen of Chilmark, Benton painted countless pictures of crusty Yankees. The stories and people behind the paintings are recounted by Polly Burroughs, along with color illustrations.

The Benton house in Chilmark is depicted as a place of constant conviviality. A hearty woman with an Italian wife's understanding of impetuous men, Rita held the home together, cared for their two children, and provided a warm haven for Benton's friends. Among the friendships Miss Burroughs tells about, the one with his student, Jackson Pollock, is the most revealing, starting from Pollock's first visit to the island on to his fascination with Rita, to whom he had made a long-distance telephone call a day or two before his death in a car crash.

The Bentons left New York in 1935 and

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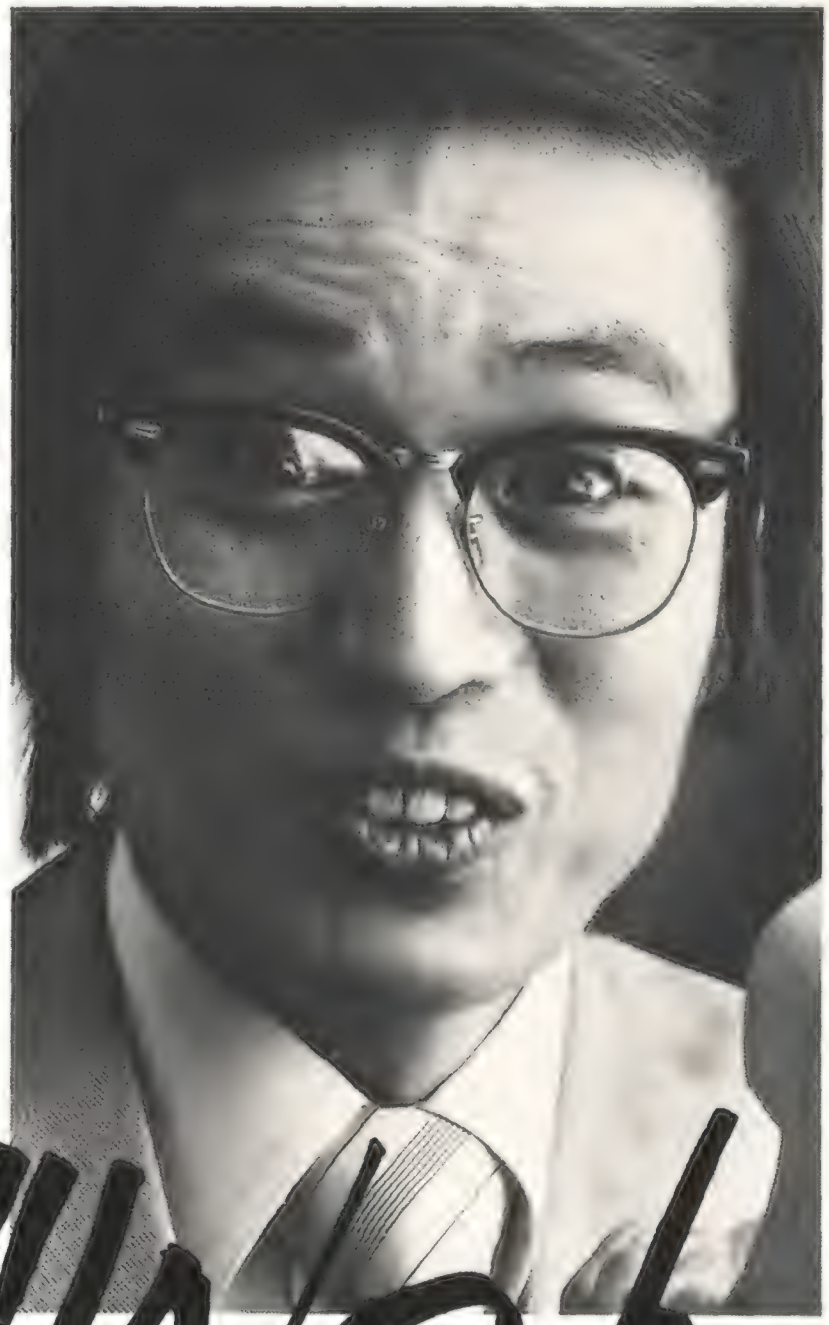

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moved to Kansas City, but Martha's Vineyard remained in their lives. Midwestern cornfields are what Benton is known for, but it was the landscape of the sand dunes of Martha's Vineyard that tied his art and life together.

Charlotte Moser
Art critic and writer

The Mismeasure of Man
Stephen J. Gould
W. W. Norton, $14.95

How smart are we? At times not very, as this fascinating analysis of our foolish attempts to quantify human intelligence reveals. With characteristic, if unmeasurable, wisdom and wit, Harvard evolutionary biologist Stephen J. Gould reviews the history of racial ranking, starting with 18th- and 19th-century justifications.

Gould's list of apologists for white intellectual supremacy is distressingly long. It includes such giants of science as Cuvier, Lyell, Darwin and the virulently racist Louis Agassiz, and such champions of democracy as Franklin and Lincoln. Even Jefferson tentatively wrote, "I advance it therefore, as a suspicion only, that the blacks . . . are inferior to the whites in the endowment both of body and of mind." The preevolutionary "scientific" rationales for such bias were degeneration, a decline among certain races from Eden's perfection; and polygenism, the concept of separate and unequal species of Man. Stranger yet were the notions of S. A. Cartwright, a 19th-century Southern physician who believed blacks suffered mentally and physically from *dysesthesia*, the inefficient removal of carbon dioxide from the lungs, and from *drapetomania*, the insane desire to run away.

Late in the last century craniometry became the scientific instrument of choice for supporting a priori notions of racial superiority. Skull weights and shapes were linked to intelligence and, by the false weighting of evidence, Caucasian brains were found to be the heaviest and best formed. Individual mental assessments could now be made, so "dissection of dead colleagues became something of a cottage industry." Cuvier was indeed a mental giant, his brain the largest known in France, at 1,830 grams. Turgenev's topped the scales as the first brain to break the 2,000-gram barrier. But there were embarrassments. One of the found-

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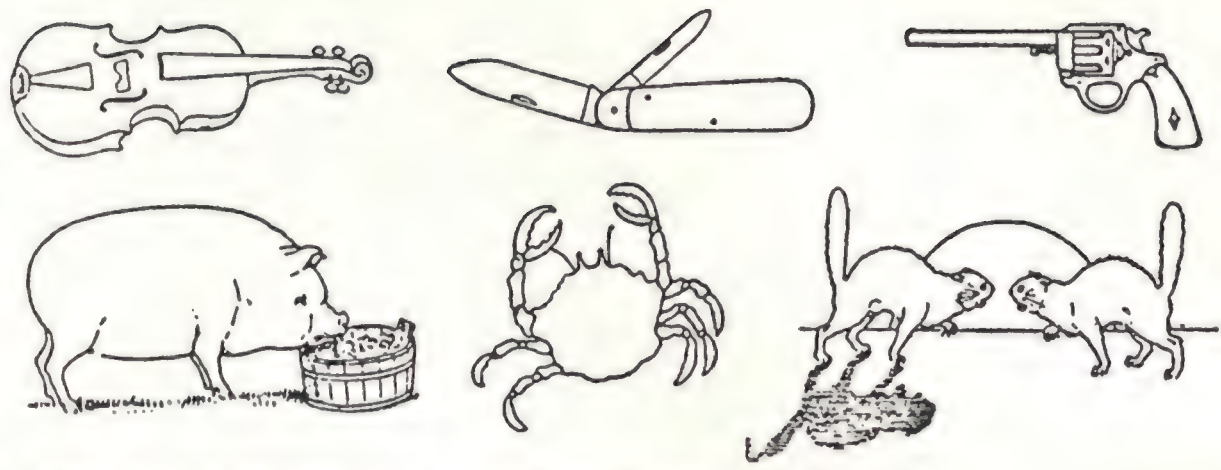
ers of phrenology was discovered to have a cerebral weight of only 1,198 grams, and Walt Whitman "managed to hear America singing with only 1,282 grams."

The mind-measuring preoccupations of 19th-century science are more than quaint curiosities now. Rather, as Gould explains it, they are the forerunners of modern IQ testing and hereditarian notions of intelligence that to this day put a biological value upon groups that is irrelevant, intellectually unsound, and highly injurious. The injuries are sadly documented in the Immigration Restriction Act of 1924, "with its low ceiling for lands suffering the blight of poor genes." They are documented, too, in half a century of forced sterilizations of Virginia's institutionalized "feebleminded."

Least culpable of the mental classers is, perhaps, Alfred Binet, an antihereditarian who saw his test as an imperfect tool, limited in application to identifying disabilities. That tool became a dangerous weapon in the hands of the doctrinists of reification—the assumption that test scores represent a single, scalable thing in the head called general intelligence.



Army recruits were tested with these pictures: what is missing?

Gould relates how Robert Yerkes administered hopelessly biased intelligence tests to World War I recruits, and how Sir Cyril Burt fudged data and twisted the application of factor analysis to support innatist and elitist prejudices.

Gould is properly incensed by the bad science, bad math and disastrous effects of the intelligence-measuring game. Graced with a lucidity well known to readers of his "This View of Life" column in *Natural History* magazine, he wages war on every front, including the complicated statistical shortcomings of IQ testing. Anticipating objections to such thorough faultfinding, he closes with a well-reasoned defense of the scientific value of debunking, and a measure of his own perspective on the importance of cultural evolution and behavioral flexibility to human intelligence.

A dandy finale, but no apologies were necessary. By any standard this is an important, entertaining, intelligent book.

Don Lessem
Boston naturalist and reviewer

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Additional reading

Antarctica's Dry Valleys (p. 52)

"A Reporter at Large (Antarctica)" by Katherine Bouton, *The New Yorker*, March 23, 1981

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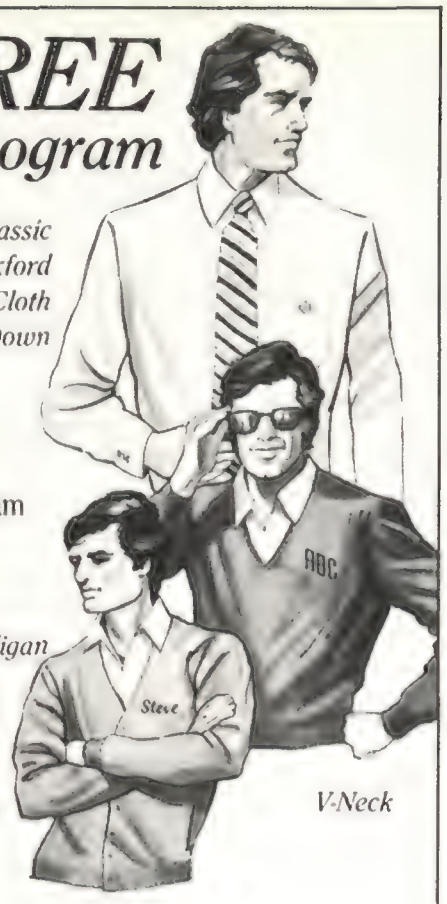

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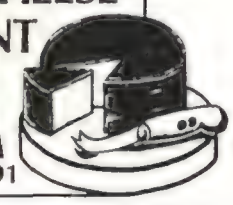

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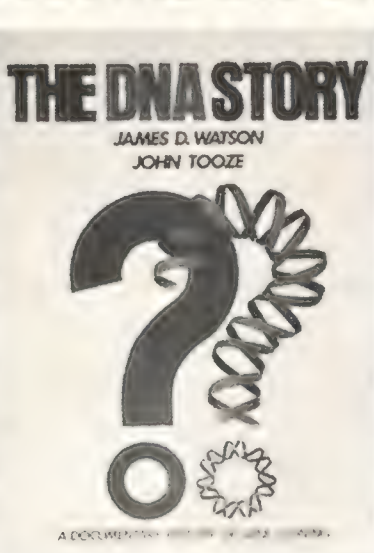

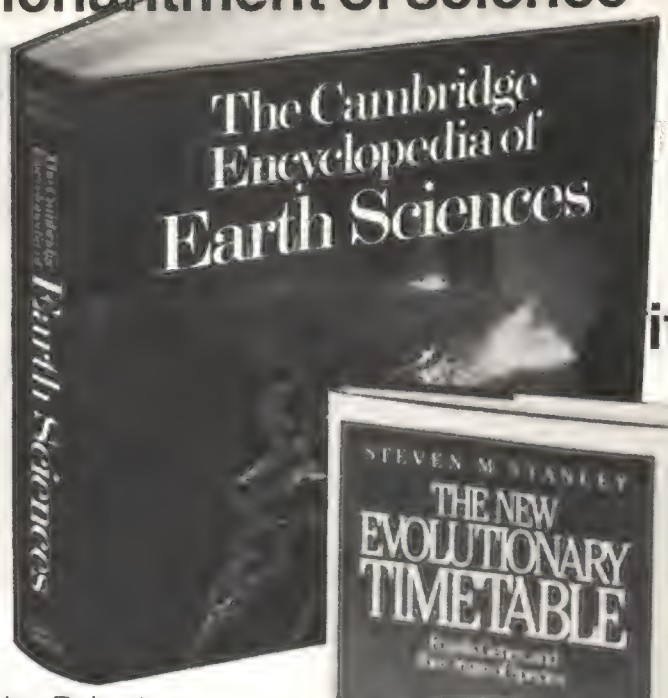

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Smithsonian Chamber Players: "The musicians, long associated with the Smithsonian's imaginative music staff, are masters of Baroque performance practices."
—Washington Post

James Weaver, conductor: "Authenticity and excitement were both well served in this performance, sensitively led by James Weaver."
—Washington Post

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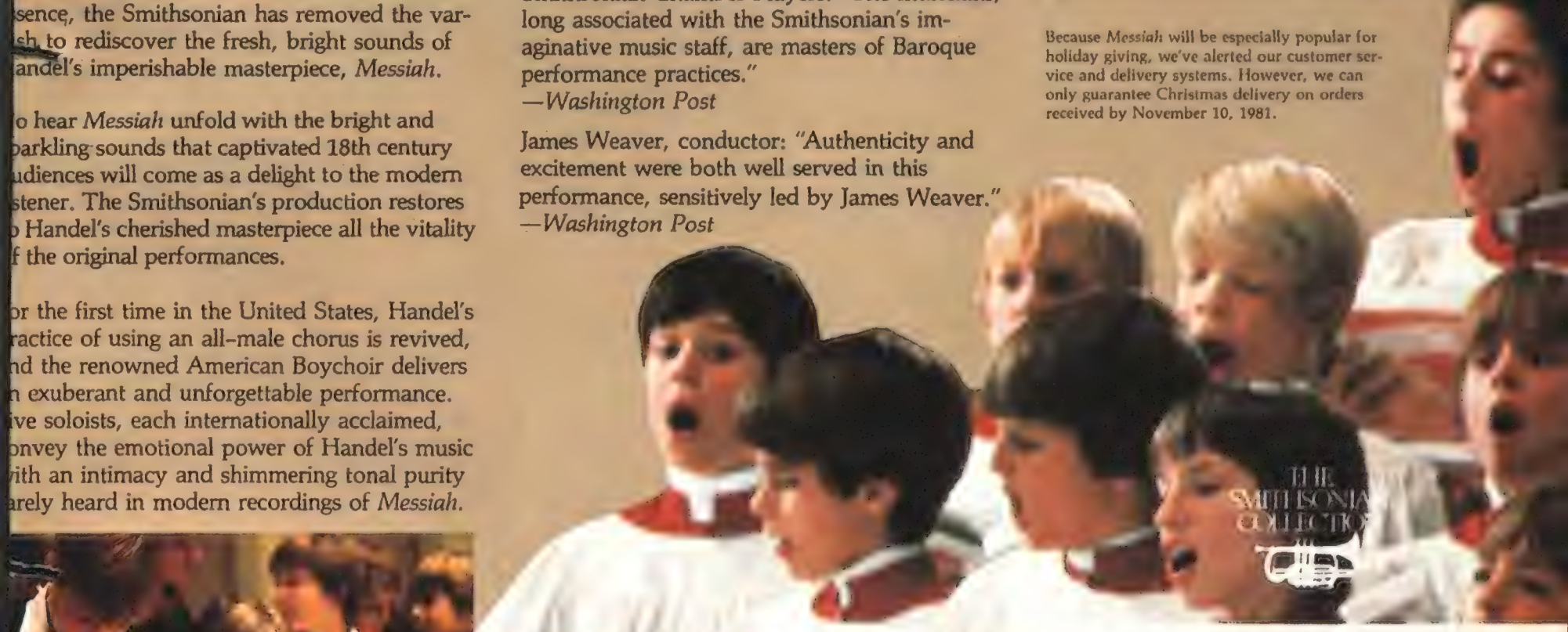

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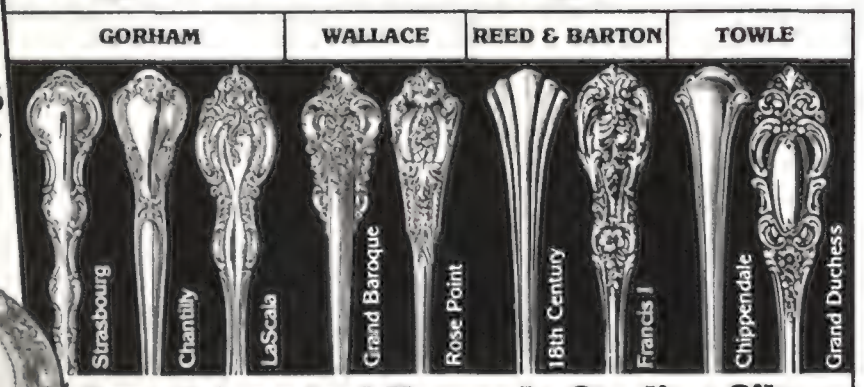

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Smithsonian highlights

A new exhibit at the Cooper-Hewitt shows that, contrary to popular belief, suburbs didn't just "spring up." In a thorough presentation of drawings, building plans, documents, brochures, models and photographs, the exhibit traces the social and architectural history of these American communities from the railroad and streetcar suburbs of the late 19th century to later industrial parks and resorts. Also included are some speculative plans for—what else—suburbs of the future.

Special November events

National Air and Space Museum
Aerial Aircraft Carriers (November-May) Mini-exhibit depicting attempt to use aircraft, including balloons and airships, to carry other craft.
Combat East and West (November 17, 7:30 P.M.) A former Polish pilot talks about World War II.
Colors in the Autumn Sky (November 7, 9 A.M.) Monthly sky lecture, Spacearium.
Aviation Films (November 5, 12, 19; 7:30 P.M.) *Wings of the Navy, Lost Squadron,* and *The Final Countdown.*

Cooper-Hewitt (New York)
Suburbs (November 10-January 24) Traces the history of suburbs from prototypes to the future.
Writing and Reading (through January 3) Hundreds of objects relating to these basic skills.

Freer Gallery of Art
The Imperial Image—Painting for the Mughal Court (through January 28) Survey of richly painted manuscripts.
Japanese Fans Illustrates importance of fans in 16th- to 19th-century societies.
Eastern Kufic Calligraphy Koran pages.

Hirshhorn Museum & Sculpture Garden
R. B. Kitaj (through November 15) Retrospective of works by this figure painter who expresses social concerns.

National Museum of American History
Free Film Theater (Wednesdays, Thursdays, 12:30 P.M., Carmichael Auditorium) Films on Tibet and Buddhism; a Third World village, Aztec and other; Indian cultures.
Perfect in Her Place (through January 24) Women at work in the 19th century.

National Museum of Natural History
Hopi Kachina: Spirit of Life (November 13-January 3) Some 150 kachina dolls, pueblos, slide show (p. 263).
Revelations of Nature (through December 6) Rarely noticed aspects of animals and plants in these close-ups by Smithsonian's Frank Greenwell (below).
Film Series (Fridays, noon; Saturdays, 2 P.M.) Films on China and the Chaco Canyon; call 357-2700 for details.
The Burgess Shale (November 20, noon) Discussion of this site of organic preservation by Fred Collier, NMH.

Photo exhibit at NMH includes this vivid skipper butterfly.

National Portrait Gallery
Portraits by George Bellows (November 4-January 3) Fourteen works by this American artist (1882-1925).
We Never Sleep: 50 Years of Pinkerton Men (through January 3) Saga of the detective agency and its personalities.
Charles Willson Peale and the Challenge of Mezzotint Portraiture (through January 3) Portrait prints.

National Museum of American Art
Alma W. Thomas (1891-1978): A Life of Art (November 26-February 22) Works by a public school teacher known for her mosaic patterns and joyful expression of life.
More Than Land or Sky: Art From Appalachia (through January 3) Works by 69 artists from 13 states.
Perkins Harnley: From the Index of American Design (through January 3) Watercolors of Victorian interiors.
The Print in the United States from the 18th Century (through January 17).

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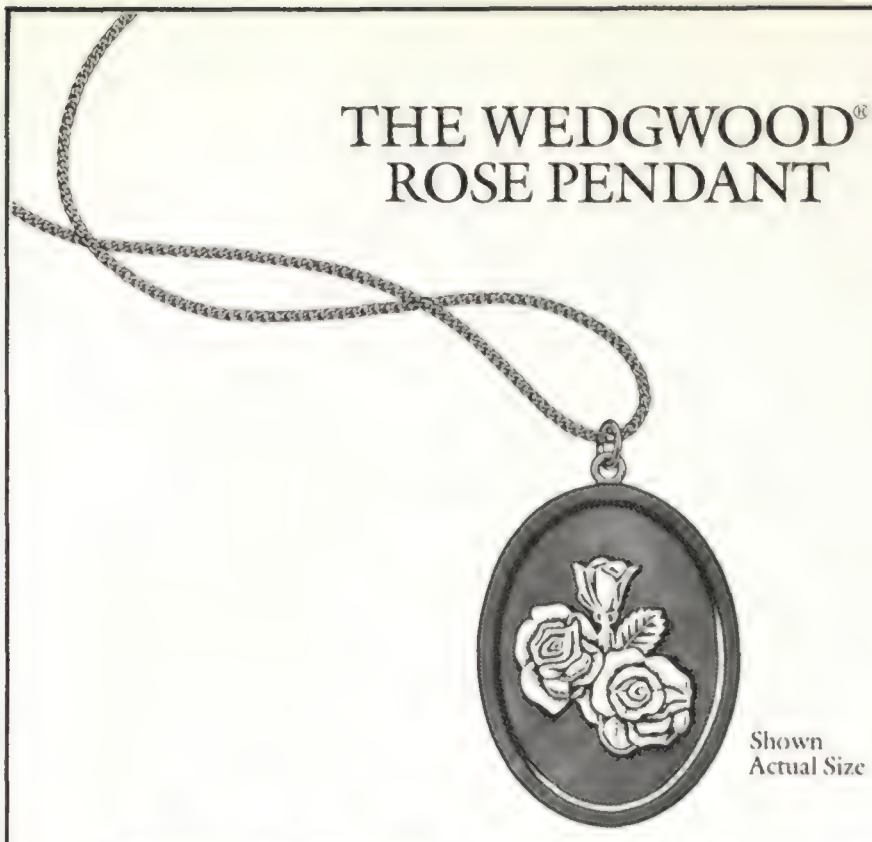

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Little wonder that jewelry from Wedgwood has been treasured — for generations — by women the world over. And with the approach of Christmas, what an inspired thought for someone *you* treasure. A gift of love that you can be *sure* she'll cherish.

Created in an exclusive single edition, the Wedgwood Rose Pendant has been specially imported for offer in this country by Calhoun's Collectors Society. And the affordable price of $29.95 per pendant includes an 18-inch neckchain as well as a luxurious presentation case.

15-Day No-Risk Examination

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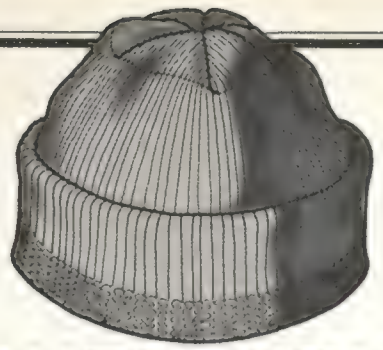
*Minnesota residents add 5% ($1.50) sales tax. Please allow 6-8 weeks for delivery. 1853-BBF



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Smithsonian events

For tickets and price information on Resident Associate events, call 357-3030:

Acid Rain and Its Impact on Wildlife and Natural Ecosystems (November 16, 6 and 8:30 P.M.) Cornell Professor Gene Likens lectures in Audubon Lecture Series.

An Evening with Alice Neel (November 11, 8 P.M.) A talk by the portraitist.

Arshile Gorky (November 24, 6 P.M.) Talk by Harry Rand on the subject of his book.

The Roads of Exile: The Last Years of Jean Jacques Rousseau (November 12, 8 P.M.) A fascinating film portrait.

Animation: New Life for City Centers (November 19) All-day symposium.

Alec Guinness Film Series (begins Sunday, November 15).

Decorative Arts of the Royal Collections (November 4, 8 P.M.) Lecture.

The Biblical Exodus: A Geography and Chronology (November 10, 8 P.M.).

For information and tickets to Division of Performing Arts events, call 357-1500:

Tenth Anniversary Jazz Series (November 27-29) Includes four concerts by vibraphonist Red Norvo, alto-saxophonist Benny Carter, blues singer Alberta Hunter and the big band sound of the Smithsonian Jazz Repertory Ensemble.

Gospel Weekend (November 20-22) Concerts and workshops.

Original Texas Playboys (November 15, 8 P.M.) Country music.

Viennese Chamber Concert (November 30, 8 P.M.) Music during George Washington's time; lecture at 5 P.M.

Telemann (November 14-16, 8 P.M.) Three concerts by Smithsonian Chamber Players.

20th Century Consort (November 8, 7 P.M.) Smithsonian's chamber ensemble.

Membership Benefits

Most Smithsonian museums on the mall are open daily from 10 A.M. to 5:30 P.M. Begin your visit at the Associates Reception Desk in the castle. Here from 10 A.M. to 4 P.M. a warm welcome includes special membership materials and details about benefits: dining in The Court, discounts in museum shops and the slide/lecture orientation to the 13 Smithsonian museums. In the adjacent Associates Lounge, see the special exhibit commemorating the Battle of Yorktown, 10 A.M. to 5:30 P.M. daily.

To receive a free previsit information packet, send postcard or phone Associates Reception Center, Smithsonian Institution, Washington, D.C. 20560 (202-357-2700 or, for hearing impaired, TDD 202-357-1729). Allow two weeks for receipt.

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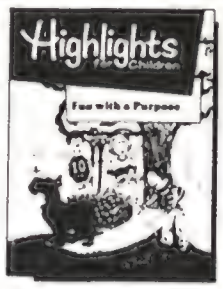

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Shell Answer Series #28

CONSERVATION PAYBACK

How to choose home energy-savers which pay for themselves

Tear out and save.

by Ed Mergens, Shell Manager of Energy Conservation

Come to Shell for answers

S1

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When you invest in conservation, you want a good return on your money. This guide can help.

I recently traveled across the country, climbing through attics and crawling through basements to prove a point. When it comes to conservation, you don't always have to spend more money to save more energy.

Instead, be money smart. Look for conservation measures which will pay for themselves, in a reasonable length of time, through the energy they save. These are called "cost-effective" measures.

In my travels, I learned that what might be cost-effective in one part of the country might not somewhere else. I'll tell you more about that later.

Q. How can I tell if something is cost-effective?

A. You can figure a simple payback by dividing the cost of the measure by its first year's energy savings. For example, installing a water heater insulation blanket yourself might cost $25, but it could save you $20 in the first year.

$25 ÷ $20 = 1¼ years.

This shows it should pay for itself in one year and three months—certainly a reasonable length of time for a payback.

It's practically impossible for you, by yourself, to estimate just how much various conservation measures will save you. That's why you need an energy auditor.

Q. What is an energy auditor?

A. An energy auditor is a professional who is trained to find energy wasters and tell you about cost-effective ways to stop the waste.

Many major utility companies across the nation have developed auditing programs to help their customers conserve. And the price is a real bargain—usually $15 or less.

About the author

Ed Mergens received his B.S. in Chemical Engineering from Villanova University, and then spent three years in the Marines before joining Shell in 1955. Now, as Manager of Energy Conservation, he is primarily responsible for the energy conservation programs carried out in Shell's refineries and chemical plants.

He is also chairman of the Corporate Energy Conservation Team, which monitors all conservation programs throughout the company.

Call your local utility company to see if they have an auditing program in effect. If so, make an appointment.

Some private companies offer auditing programs, too. Look in the Yellow Pages under "Conservation."

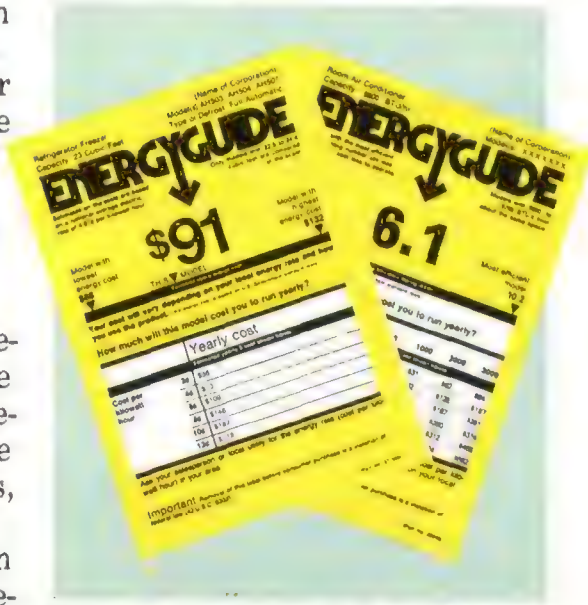
Q. What can an auditor tell me that you can't?

A. Plenty.

An energy auditor can give specific conservation tips for *your* home and *your* family in *your* climate region. This is very important because every household uses, and loses, energy differently.

To illustrate this, I went with energy auditors to homes in three regions of the country: the cold Northeast, the hot South, and the mild Northwest. On pages 4, 5, and 6, you'll see how the auditor's findings changed from place to place.

APPLIANCE LABELS



These appliance labels show the yearly energy cost of operating various major appliances, so you can compare. A more efficient appliance might cost a little more to buy, but as you use it, the money you save on energy should more than make up the difference.

What is included in an energy audit?

A qualified energy auditor will offer an on-site inspection of your home, then give you a written report listing various conservation measures which you could use.

The report will tell you approximately how much each should cost and how much energy or money each could save. Then *you* can decide which measures are cost-effective for your home.

That's me with the energy auditor in Houston. She's showing me the detailed report she prepared for the homeowners.

AUDITOR'S REPORT—OREGON.....

I selected Portland for its mild climate, with winter temperatures rarely dipping below freezing, and summer months in the mid-to-high 70's.

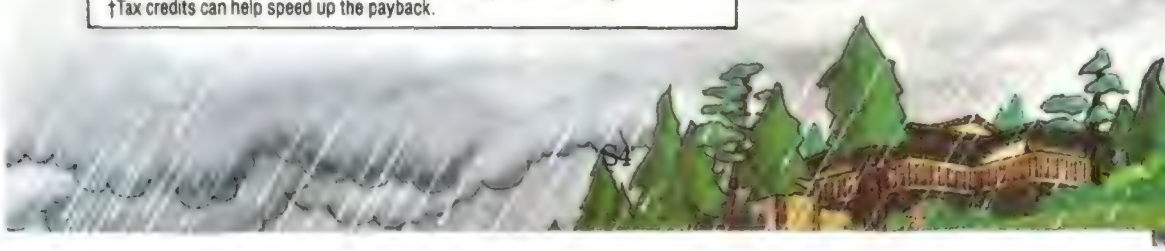
Although the temperatures are moderate, there is frequently a chill in the humid air. Heating is the biggest energy expense for local homeowners.

I visited the Wilsons' home, which is like many in the Northwest —a one-story, frame, all-electric home built on a hill. Under the house, their large, unheated crawl space revealed a big potential for increased energy conservation: uninsulated heating ducts and an uninsulated floor.

NOTE: Cost and savings figures are for this house only. Consult an auditor for specifics about your house.

CONSERVATION MEASURES	COST		SAVINGS	WILL PAY FOR ITSELF IN†		POSSIBLE TAX CREDIT	
	Do It Yourself	Contractor	1st Year	Do It Yourself	Contractor	Do It Yourself	Contractor
Increase Attic Insulation From R-13 to R-30	$225	$ 417	$ 32	6.9 yrs.	12.9 yrs.	YES $34	YES $63
Insulate Walls to R-11	NOT ADVISED	475	168	—	2.8 yrs.	—	YES $71
Caulk/Weatherstrip Windows & Doors	70	225	137	0.5 yr.	1.6 yrs.	YES $10	YES $34
Add Storm Windows & Doors	615	1230	90	6.8 yrs.	13.7 yrs.	YES $92	YES $185
Insulate Water Heater	27	35	22	1.2 yrs.	1.6 yrs.	YES $4	YES $5
Install Automatic Thermostat Timer*	60	125	40	1.5 yrs.	3.1 yrs.	YES $9	YES $19
Insulate Floors to R-19	315	753	92	3.4 yrs.	8.2 yrs.	YES $47	YES $113
Insulate Ducts	150	330	213	0.7 yr.	1.5 yrs.	YES $23	YES $50

*To reduce heat from 70° to 55° for two eight-hour periods each day.
†Tax credits can help speed up the payback.



AUDITOR'S REPORT—CONNECTICUT.....

Like much of the Northeast, Fairfield County, Connecticut, has long, hard winters.

A well-insulated, weathertight home is especially important in a climate like this, but because many of the homes were built many years ago, they are often not very energy efficient.

I visited the Maxims' home in Riverside, where their 43-year-old two-story Colonial home is typical of the area.

The Maxims' heating bills were extra high because of an inefficient oil furnace. The auditor showed how a simple burner adjustment, costing $45, could save the family $129 in the first year!

NOTE: Cost and savings figures are for this house only. Consult an auditor for specifics about your house.

CONSERVATION MEASURES	COST		SAVINGS	WILL PAY FOR ITSELF IN†		POSSIBLE TAX CREDIT	
	Do It Yourself	Contractor	1st Year	Do It Yourself	Contractor	Do It Yourself	Contractor
Increase Attic Insulation From R-15 to R-30	$155	$ 365	$ 28	5.5 yrs.	13.1 yrs.	YES $23	YES $55
Increase Wall Insulation From R-4 to R-12	NOT ADVISED	2158	346	—	6.2 yrs.	—	YES $300 max.
Caulk/Weatherstrip Doors & Windows	101	268	88	1.1 yrs.	3.5 yrs.	YES $15	YES $40
Add Storm Windows & Doors	790	1620	155	5.1 yrs.	10.5 yrs.	YES $118	YES $243
Install Automatic Thermostat Timer*	50	80	250	0.2 yr.	0.3 yr.	YES $7	YES $12
Insulate Basement Walls	621	1191	360	1.7 yrs.	3.3 yrs.	YES $93	YES $179
Have Furnace Burner Tuned Up	NOT ADVISED	45	129	—	0.3 yr.	NOT ELIGIBLE	NOT ELIGIBLE
Buy New Boiler or Furnace	—	1800	225	—	8 yrs.	NOT ELIGIBLE	NOT ELIGIBLE

*To reduce heat from 65° to 55° for eight hours each night.
†Tax credits can help speed up the payback.

AUDITOR'S REPORT—TEXAS.....

Houston is notoriously hot and humid, with sweltering summers and mild winters.

In such a climate, heating bills are minimal while air conditioning costs are staggering.

One of the best ways to save energy in the blistering Sun Belt is to keep the sun's heat out of the house. Shade trees can help.

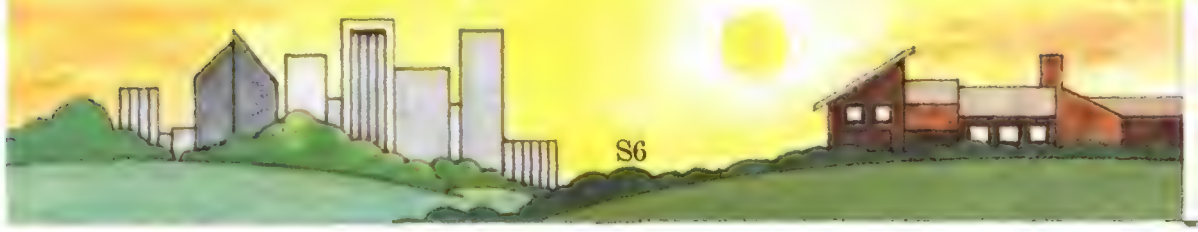
But the Ferrell family has a new house without many trees. And practically all their windows face east or west—bad directions for sun heat gain.

I showed them how solar screens, which can cut out up to 70% of the sun's rays, could pay for themselves in only three years.

NOTE: Cost and savings figures are for this house only. Consult an auditor for specifics about your house.

CONSERVATION MEASURES	COST		SAVINGS	WILL PAY FOR ITSELF IN†		POSSIBLE TAX CREDIT	
	Do It Yourself	Contractor	1st Year	Do It Yourself	Contractor	Do It Yourself	Contractor
Increase Attic Insulation From R-8 to R-22	$260	$315	$ 98	2.6 yrs.	3.2 yrs.	YES $39	YES $47
Caulk Around Windows	41	61	18	2.3 yrs.	3.4 yrs.	YES $6	YES $9
Add Storm Window (On North Side Only)	23	57	2	11.5 yrs.	28.5 yrs.	YES $3	YES $9
Insulate Water Heater	16	40	43	0.3 yr.	0.9 yr.	YES $2	YES $6
Install Automatic Thermostat Timer*	50	110	148	0.3 yr.	0.7 yr.	YES $7	YES $16
Install Solar Reflective Screens	—	221	86	—	2.6 yrs.	NOT ELIGIBLE	NOT ELIGIBLE

*To reduce load on air conditioning and heating by six degrees for ten hours every day.
†Tax credits can help speed up the payback.



Q. How you conserve differs from climate to climate, right?

A. Right—from climate to climate, and even from house to house.

Every situation is different, but it's safe to say that the colder the climate, the more cost-effective some conservation measures usually become.

These include insulation (all around the house), storm windows and doors and plugging air leaks with weatherstripping and caulking.

While homes in hot climates need to be insulated and weathertight to keep cooling bills down, these conservation measures become even more important for reducing heating costs in very cold climates.

For specifics about your house, it's still best to consult an auditor.

Q. Aren't some things cost-effective wherever you live?

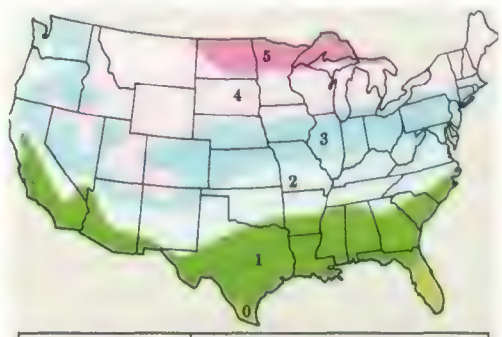
A. A few. Any conservation practice you can do free (cutting back the thermostat, washing clothes in cold water, taking short showers instead of baths, drying clothes outside on a line, closing the fireplace damper) is, of course, cost-effective.

Inexpensive measures will usually pay for themselves, too. Especially do-it-yourself projects like installing shower flow restrictors, caulking and weatherstripping, sealing air leaks in heating and air conditioning ducts with duct tape, and installing a water heater insulation jacket.

Q. Will extra insulation pay for itself?

A. Insulation is very important, but figuring its cost-effectiveness can be tricky.

As a rule, adding attic or floor insulation is always cost-effective if you had none to begin with. But adding to existing insulation or adding wall insulation to an existing home, may or may not be worth it. Better ask your auditor.



HEATING ZONE	RECOMMENDED FOR CEILING	WALL	FLOOR
0, 1	R-26	R-13	R-11
2	R-26	R-19	R-13
3	R-30	R-19	R-19
4	R-33	R-19	R-22
5	R-38	R-19	R-22

This map provided by the National Solar Heating and Cooling Information Center shows the minimum recommended "R-value" for attic, wall and floor insulation in different parts of the country. R-value is a measure of insulation's resistance to heat transfer. The higher the R-value, the more effective the insulation.

Q. Aren't there some tax benefits for conserving, too?

A. In many cases, yes.

You can get back 15 percent of the money you spend on insulation, caulking and weatherstripping, storm windows, certain furnace improvements, and some other items — from $10 to $300 back — through tax credits. And tax credits

can give you back 40 percent of your investment in many solar, wind, geothermal, and other renewable resource products — from $10 to $4000 back.

There are a few exceptions, and tax laws do change, but this can be an excellent opportunity for extra savings. Call your local Internal Revenue Service office for full details. Also ask about any state and local tax benefits available.

Q. How much can I actually save?

A. Anywhere from a little to a lot.

In Shell's Answer Guide #22, "The Home Energy-Saving Guide," we showed you how to save up to 50 percent of your home energy bills. That can really add up, especially as energy costs rise. Tax credits can mean extra benefits, too. Your home will probably be worth more at resale, as more and more home buyers look for energy-efficient homes.

Call your local utility company today to learn how many ways they can help you conserve. And if you have any questions about the information in this guide or you'd like a copy of "The Home Energy-Saving Book," write to me, Ed Mergens, Shell Oil Company, P.O. Box 61609, Houston, Texas 77208.

Shell wishes to thank the following for their help in preparing this guide. Houston Lighting & Power Co., CONN SAVE, Inc., Portland General Electric Co., The Energy Saving Center, Pacific Power & Light Co., Cornerstones Energy Group, Planergy, Inc., and all the families who allowed us into their homes during our research.

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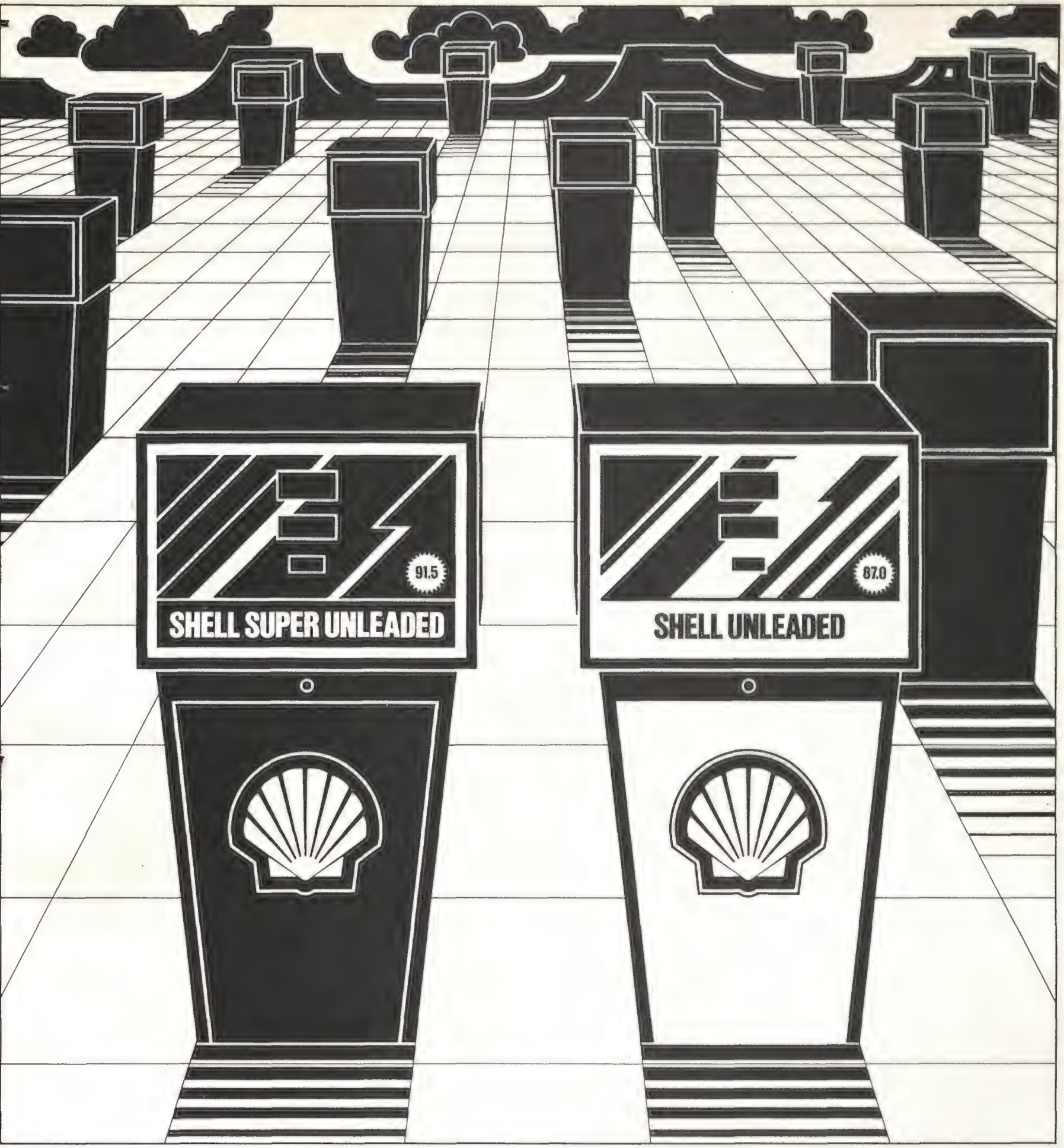

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Naughty Marietta, Victor Herbert's beloved operetta of 1910, will be broadcast this month by Smithsonian on many public radio stations throughout the country. In addition to this special broadcast, Radio Smithsonian and Smithsonian Galaxy will take a look at deep-sea discoveries and the Golden Age of animation. To find out which area stations carry these programs, check your newspaper or write: Smithsonian Office of Communications, A&I 2472, Washington, D.C. 20560.

Smithsonian Institution Traveling Exhibition Service

SITES circulates exhibitions to hundreds of cities outside Washington. To sponsor a show in your community, write to Eileen Harakal, SITES, Smithsonian Institution, Washington, D.C. 20560. Here are some November exhibits:

Santa Ana, California (November 21-December 20) *John Sloan In Santa Fe,* Bowers Museum.

Coral Gables, Florida (November 1-29) *The Graphic Works of Odilon Redon,* Lowe Art Museum.

Chicago (November 21-December 27) *Berlin Porcelain,* Chicago Museum of Science and Industry.

Salina, Kansas (November 14-December 13) *Contemporary Czechoslovakian Print Makers,* Salina Art Center.

Baltimore (November 14-December 13) *Transformed Houses,* Peale Museum.

Boston (November 14-December 13) *The World of Haitian Paintings,* Boston University.

Midland, Michigan (November 21-December 20) *A Gift to the Street,* Midland County Historical Society.

St. Louis (November 12-January 3) *Mary Cassatt,* St. Louis Art Museum.

New York City (November 7-January 3) *Renaissance of Islam: Art of the Mamluks,* Metropolitan Museum of Art.

Columbus, Ohio (November 21-January 3) *Paintings of the Figure from the National Academy of Design,* Columbus Museum of Art.

Lawton, Oklahoma (November 14-December 13) *Edison and the Electrical Age,* Museum of the Great Plains.

Corvallis, Oregon (November 7-December 6) *We'll Never Turn Back,* Oregon State University.

Philadelphia (November 7-December 6) *Beauties of the Coral Reef,* Academy of Natural Sciences.

Abilene, Texas (November 14-December 13) *The Photographer's Hand,* Abilene Fine Arts Museum.

Seattle (November 21-December 20) *Aquaculture,* Seattle Aquarium.

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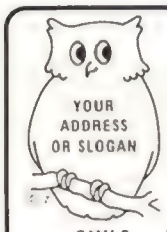

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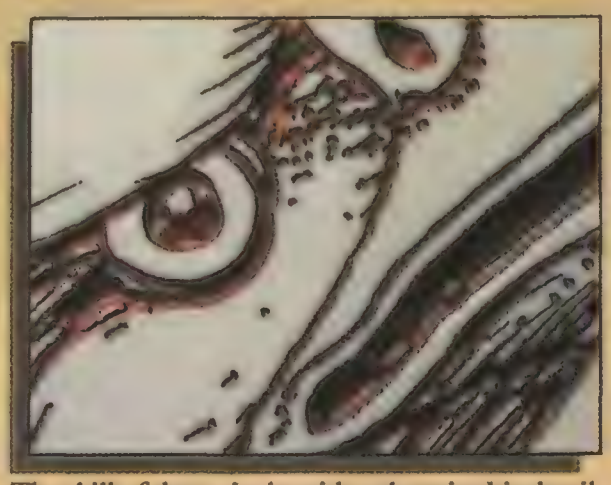

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Kachinas and the Hopi world

Nata-aska, the black ogre kachina, teaches good behavior.

Sometimes Piptuka, an "ad hoc" character, turns up to clown.

Among the dolls is Situlilü, a Zuñi rattlesnake kachina.

Koshare, a clown, makes people laugh at their own foibles.

Aholi and Eototo appear in February at "Powamu" to open the growing season.

The people hope their prayers will fly with eagle kachina, Kwa.

The black ogre kachina at top left is a disciplinarian who teaches the children how to behave. The two chiefs on the right open "Powamu," which begins a six-month season of prayer and dance ceremonies. And the watermelon-eating clown in the center pokes fun at the crowd and makes them laugh—although sometimes he has a serious point to make.

These dolls, on display through January 3 at the Museum of Natural History, are representations of the kachina spirits which, the Hopi believe, descend to carry prayers to the gods and, equally important, inspire the people toward good thoughts and deeds. Says Emory Sekaquaptewa of the University of Arizona, "The Hopi believe that when a man dies he becomes a kachina, but kachinas are also birds and clouds—all things in this world have a spiritual counterpart."

For the ceremonial dances, the Hopi undergo purification, pray, don masks, and costumes and, in a complex and esoteric ritual, become kachinas. The people pray for rain, good health, fertility, sun, clouds—anything that might improve life on the sparse, arid mesas of northern Arizona where they and their ancestors have lived for centuries.

Each kachina represents a different spirit. Sometimes a kachina fails to return, such as Movitkuntaka whose appearance was followed by a spate of bad weather. The chicken kachina turned up in the mid-1800s after the people began raising chickens. And in a stroke of genius that characterizes the adaptability of the Hopi, the Wik'china, or greasy hand, keeps spectators during public dances at a reasonable distance.

A kachina doll is called a *tihu*, which means child. The figures are carved from cottonwood root. Historically, they were stiff and simply dressed. Today they sport active positions, a leg up or a fist raised, and are decorated with shiny acrylic paint, fur, beads, silver and other trim. In the exhibit, more than 150 of these dolls "dance" amidst replicas of pueblos. The show was organized by the California Academy of Sciences, which also produced a detailed catalog. For those who can't travel to the Arizona mesas to see the kachinas, the exhibit offers a tiny glimpse into the Hopi world.

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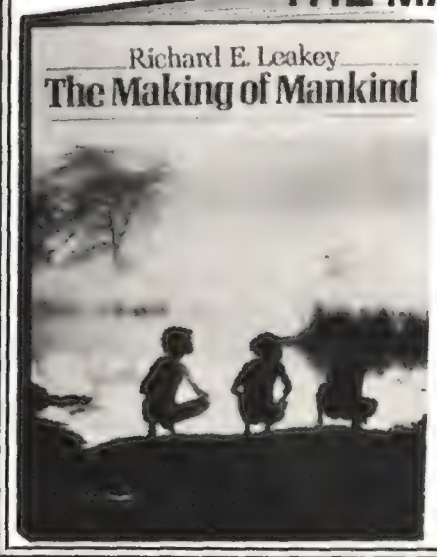

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Christmas at the Smithsonian December 4-6: Join curators and staff for behind-the-scenes tours of selected museums, including the new dinosaur exhibit in the Museum of Natural History. Enjoy an elegant dinner in the castle and a concert by the National Children's Choir.

Baja Whale Watch February 12-20: Sportfishing boat serves as base for observing gray whales; hikes and lectures focus on the natural history of the Baja islands.

South Texas Wildlife February 18-25: Follow the winter bird migration to the Gulf of Mexico and Rio Grande Valley while visiting the wildlife refuges of Aransas, Padre Island, Laguna Atascosa and Santa Ana.

Yellowstone in Snow February 19-28: Cross-country skiing in Jackson, Wyoming, and Yellowstone National Park to discover the splendors of nature.

Everglades March 6-13: Explore a subtropical wilderness best known for its abundance and variety of birdlife and home to deer, otter, and alligator. Activities include canoe trips and visit to Corkscrew Swamp Sanctuary.

Washington, D.C.: Power and Style March 30-April 4: Discover the fascinating people and events that have shaped our nation's capital. Spend a day in Congress; explore charming, restored neighborhoods; visit memorials during cherry-blossom season.

Sea of Cortez April 24-30: Adventure cruise off Baja Mexico exploring the rich variety of plants and migratory seabirds on the Midriff Islands, and observing finback whales, porpoises and dolphins.

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Panama and the Spanish Main January 9-16: Experience the thrill of traveling from the Pacific to the Atlantic through the Panama Canal. Continue to the fascinating San Blas islands, then the Spanish Main bastion of Cartagena. Our chartered ship *Jason* also calls at Bonaire in the Dutch Antilles, Barbados and Margarita—the pearl island.

Mayan Mexico: The Yucatán Peninsula January 21-February 2 or February 10-22: The extraordinary ruins of the Yucatán in the company of an archaeologist—Uxmal, Palenque, Labná, Sayil, Kohunlich, Cobá, Tulum and Chichén Itzá.

Kenya January 28-February 14: Incomparable wildlife is observed in old safari tradition. Seminars in Nairobi, and in the field at Masai Mara, Samburu, Kilaguni. Meet local citizens and visit a school and handicraft center.

Tall Ship Adventure February 12-21: Set sail on the luxurious 317-foot, four-masted sailing yacht *Sea Cloud* from Antigua to the Grenadines. Lectures and excursions enhance this fabulous sailing experience in the Caribbean.

Zapotec and Mayan Mexico February 24-March 8 or March 17-29: Oaxaca and Zapotec sites of Monte Albán and Mitla; San Cristóbal de las Casas; Palenque, Uxmal and other Mayan ruins in the Yucatán.

Red Sea Passage February 25-March 7: Sail from Suez on the *Argonaut*, visit Karnak, Luxor, Valley of the Kings, Abu Simbel in Egypt and Petra in Jordan. Tour the mosques and bazaars of Cairo, the Sphinx and pyramids at Giza. Optional Jerusalem prelude—February 18-26.

Morocco March 5-20: Exotic Fez, Marrakesh and Rabat, colorful and tempting markets in ancient medinas, the powerful and lonely beauty of desert and mountain provide an exciting learning experience.

Australia March 19-April 6: Discover the diversity of "Down Under." Visit Sydney, Melbourne, the Barrier Reef, Alice Springs and Ayres Rock.

Ecuador and the Galápagos Islands April 4-15: Visit Quito, then travel by train to Guayaquil to board the *Buccaneer* for a seven-day voyage through the Galápagos Islands. Participate in seminars and meet with scientists at the Charles Darwin Research Station; observe the rich plant, bird and animal life.

Canals and Old Masters April 16-28: Art museums, historic sites, and spring flowers highlight visits to Brussels, Antwerp, and Ghent. From Bruges, sail on rivers of Belgium and Holland, ending with four colorful days in Amsterdam.

Crete and Rhodes May 3-17: Complex Minoan palaces, Byzantine frescoes, the medieval walled city of Rhodes, and the superb acropolis of Lindos are surrounded by the sparkling beauty of these Aegean islands.

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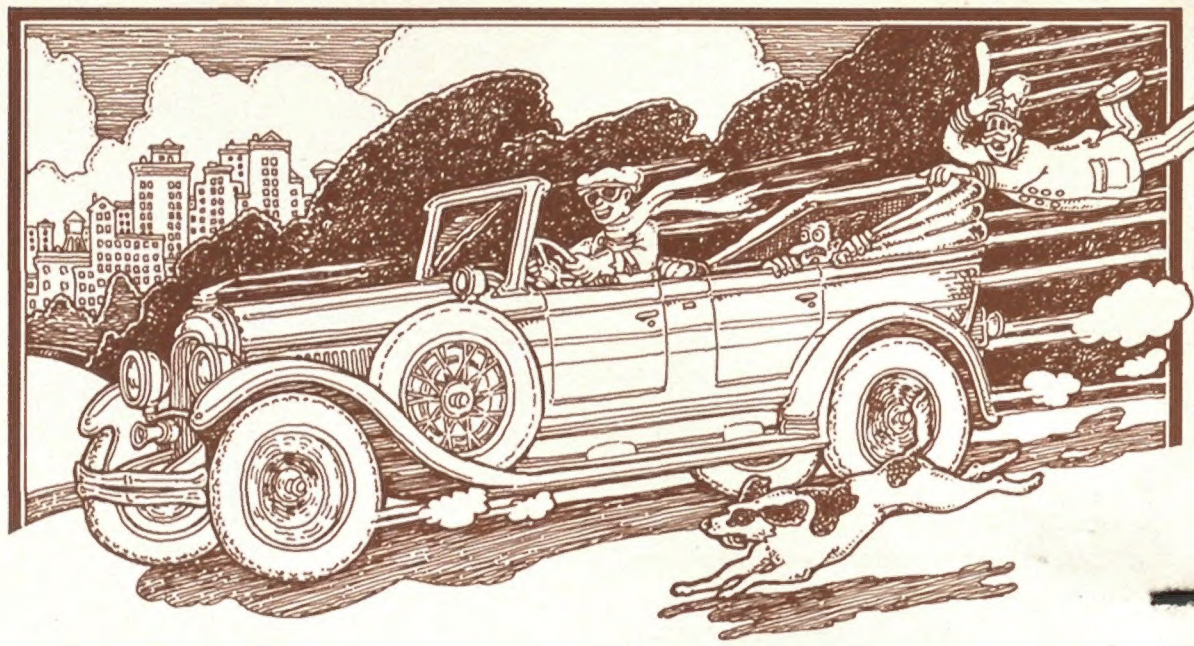
by Richard L. Williams

Feeling smug with a vroom *of one's own*



Lately I find I am staying out of the fast lane and driving slower (more slowly, that is) in a more relaxed, less het-up mood, much to the relief of my wife. After 50-odd years of driving, she points out, it is high time. There are compensations, beyond a lowering of blood pressure that must go along with a lowering of speed. One sees more of the landscape and cityscape, has more time to wave to the joggers and—you should believe this—doesn't spend that much more time getting from here to there.

What I drive isn't used to going slow. It's a 13-year-old Road Runner with a 383-cubic-inch-plus engine, with a four-barrel carburetor, dual exhausts and all. "Plus" because a son rebored the cylinders, so it is a bit bigger than 383 under the hood.

He also installed new brakes and shock absorbers and tires, had it repainted a blackish dark green, and in sum turned it into what his generation calls a race car. It was a powerful gas-guzzler before and by now is even more powerful, even more of a gas-guzzler. The girl at the neighborhood gas station keeps saying "back so soon!" when I show up, although I've explained to her that the son sold me the car at such a ridiculously low price (he wanted to buy a pickup) that it can guzzle away for years before the break-even point arrives.

Teen-agers in parking lots keep asking if it's for sale (after one good look they know better than to ask, "Wanna race?") and so far the answer is "not yet," with a smiling shake of the head. But it's flattering to be asked.

It's also nice to know that if pressed the Road Runner probably could get away from anything on the road. I resist the temptation to press.

And after being brought up to drive fast! When the Imperial 80 first came out, my job working for my father, the demon automobile salesman, was to demonstrate it for sheriffs and police chiefs who wanted to know whether, as advertised, it could overtake everything and anything on the road.

We used steep East Madison Street in Seattle as our proving ground. From a standing start at the bottom of that umpteen-block-long hill, I would give the Imperial the gun, then accelerate easily past every poor slob who was laboring up the grade.

(There was no such thing as an automatic transmission then; part of my job was to stick-shift from first to second to high, or double-clutch from high gear down, so smoothly that the back-seat passengers would remain innocently unaware of the gear shifting.)

At the top of the Madison hill we were all but flying (well, going at least 55), with the bug-eyed lawmen in back feeling the seat-back pushing hard between their shoulder blades, and feeling most impressed by all that horsepower. Not the best way to learn respect for the law, but great fun.

A lot of Imperials were bought by sheriffs and police chiefs after such breathtaking demonstrations, which indeed proved that the overpowered car *could* overtake just about any machine it chased.

For years afterward I drove fast out of habit (never could afford an Imperial), but thanks to luck and to keeping a wary eye out through the rearview mirror, got no speeding tickets. I did keep in mind Dad's somewhat cynical (but exceedingly healthful) admonition: "Always drive as if the other guy is crazy and may do the unexpected at any moment."

Driving fast imparted a sense of power, and perhaps that is what impels so many drivers nowadays to floor it at every opportunity. Not just in Texas' wide-open spaces, either. They drive fast and furious along "suicide alley" south of San Francisco, on the interstates around Binghamton, New York, on Detroit's infamous Woodward Avenue, and on narrow highways in North Carolina.

One has to wonder, as they whiz by, lane-switching like mad: What's their hurry? At the next traffic light they're all of one car length ahead of the rest of us benighted motorists.

Never mind. Let the Mustangs, the Jags and the Mercedes fly by, 55 being a law they can't seem to live with. At the next traffic light they'll be a bit (maybe 15 feet) ahead of the game, and one hopes they (their drivers, that is) feel better. The driver of the Road Runner feels better too, knowing that if he felt like it he could put a heavy foot on the gas pedal and leave *them* far behind. *Vroom, vroom, vroom.*

10:17P.M.

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